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THE

Dental Summary

EDITED BY

L. P. BETHEL, M. D., D. D. S.

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The dentist, in a fever of impatience, waited for the victim to lose consciousness, but the nervous man insisted on keeping one eye open, though he had had enough gas to float an airship.

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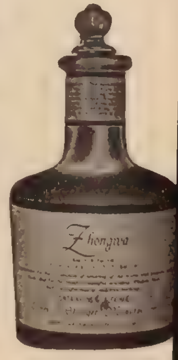

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REGULAR CONTRIBUTIONS

THE IMPACTED LOWER THIRD MOLAR, ITS PATHOLOGICAL SIGNIFICANCE AND AN OPERATION FOR ITS REMOVAL.*

BY CHALMERS J. LYONS, D.D.SC., JACKSON, MICH.

THERE ARE TWO OBJECTS in view in presenting this paper to you today for your consideration. One is to call your attention to the fact that the impacted lower third molar may be the seat of a great many nervous disturbances where the etiology of the same may appear very obscure. The other is for the purpose of calling the attention of the practicing dentist to the gravity of the operation for the removal of the impacted lower third molar, that they may in turn educate their patients that this operation should not be considered merely the extraction of a tooth.

It will perhaps not be out of place in discussing this subject to say something about the etiology of the impacted lower third molar. Quoting from Tomes he says: "In endeavoring to trace the causes which have produced this class of irregularities we must recognize two distinct conditions. In the one, the tooth in pressing forward has taken the course in which the least resistance was found to its progress. In the other, the malposition has been assumed at a comparatively early period of development."

---

*Read before the Michigan State Dental Society, 1913.

Calcification of the third molar does not usually begin in the normal individual until the eighth and ninth year, at which time the second molar crowns and a portion of the roots are calcified and well on their way in the process of development. At the time of the eruption of the permanent second molars the third molars occupy recesses in the alveolar bone and are in but a partial state of development. In civilized races the room for the accommodation of the crown of the lower third molar between the distal wall of the second molar and the base of the coronoid process is frequently scant; the tendency of maxillary development is to render restricted space the rule rather than an exceptional occurrence. The crown of the tooth does not make its appearance until developmental changes have secured sufficient space to accommodate it.

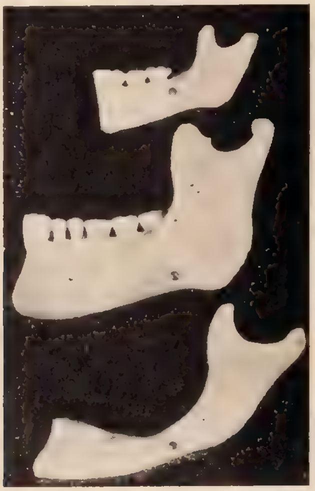


Fig. 1 showing jaws of childhood, maturity and old age.

Each tooth which has no deciduous predecessor is developed beneath the base of the coronoid process and as the base of the coronoid process recedes by absorption on its anterior and deposition on its posterior surfaces the tooth is enabled, under ordinary conditions, to come into its proper position (Fig. 1), but if the backward development of the maxilla has been arrested the interval between the second molar and coronoid process will be insufficient for normal arrangement of the presenting tooth. This may delay its eruption for months or years and, in some cases, prevent eruption altogether. (Fig. 2). The extent of the impaction varies from a partial eruption or partial imprisonment of the tooth by its bony surroundings to its entire imprisonment in any part of the mandible. If the distance between the posterior surface of the second molar and the columns of the coronoid process be very short, it is evident that upward eruption is impossible, so that the tooth may assume any direction of movement, the most common being forward, the axis of the tooth changing its position until the tooth may lie in a horizontal position or even become inverted.

Now, what of the pathological significance of this condition? In the more simple or partial impacted conditions the tooth may take its natural direction, but the space into which it has to force itself is insufficient, consequently the distal surface lies close against the coronoid process, leaving no room for the gums. This part under these circumstances is pressed upwards and lies more or less over the masticatory surfaces of the tooth and is consequently subject to be bruised from time to time by the teeth of the upper jaw. In this manner inflammation is set up and maintained. The disease seldom limits itself to the parts injured. It more commonly extends to the adjoining parts, involving the soft textures about the ascending ramus and extending to the fauces and tonsils. The acts of deglutition become painful and the motions of the jaw are restricted. If the patient be seen before any great difficulty in opening the mouth has arisen, it is good practice, in the judgment of the writer, to remove the tooth at once, for should the gum retain its unnatural position, the patient will be liable to repeated attacks of inflammation until either the lower molar or its antagonist has been removed. The same condition of parts which in one person would lead to little or no inconvenience would, in a less healthy individual produce great irritation and even necrosis (Fig. 2), the extent of the disease varying with the susceptibility of the individual. In any case the involved tooth should be removed as soon as it is found to be a source of irritation. Sometimes an impacted lower third molar may remain quiescent for a number of years and then, later, set up violent inflammation. In the efforts which the tooth makes to erupt, the pressure exerted upon the distal wall of the second molar will sometimes result in a pressure-resorption of its roots until the pulp chamber is encroached upon and a direct irritation to the pulp ensues. (Fig. 3).

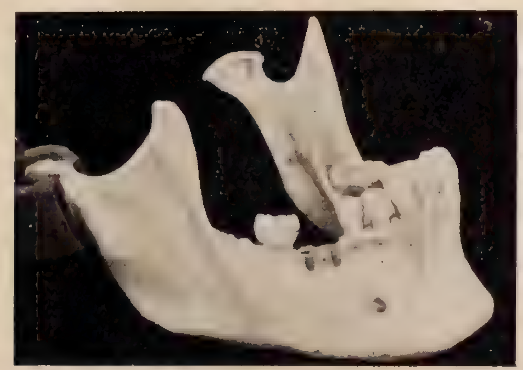


Fig. 2.

The root development of these teeth will frequently cause impingement of the root upon the inferior dental canal. (Fig. 4).

In these cases reflected pains are set up and may be seated in any part of the head which is supplied by the tri-facial nerve and its branches. In fact, the impacted lower third molar is probably the source of irritation in more cases of reflected pain than any other part of the mouth or jaws and when cases of seemingly obscure pain present, we should always look with suspicion upon the region occupied by the lower third molar.

Dr. Henry S. Upson, Professor of Diseases of the Nervous System in the Western Reserve University of Cleveland, in his book on Insomnia and Nerve Strain, ascribes the cause of many of the nervous disorders, such as insomnia, melancholy, epilepsy, etc., to impacted third molars, and has reported a number of cases as much benefited after their removal. He states that "certain types of nervous disturbances caused by dental impaction have almost the clearness of a laboratory experiment, as in it the severest symptoms are set up by the simplest irritant. Pains may be from beginning to end quite lacking." It is the constant mild irritations, although they may not be sufficient to produce pain that sets up these nervous disturbances which may of themselves take on a violent form. During the past four months the writer has removed several lower third molars for epilepsy, but the time which has elapsed since the first operations has not been sufficient to be able to make a positive statement regarding the final results. Suffice to say that in three cases improvement of the condition has been observed. In some cases of impacted third molars the acute inflammatory condition may be of such a violent nature that the immediate operation for their removal will be contra-indicated.

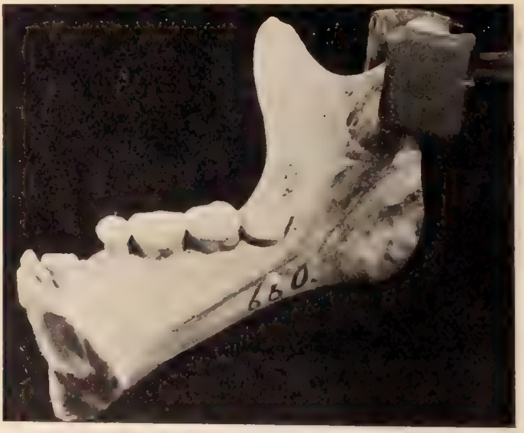


Fig. 3 shows necrosis distal to third molar.

It may be apparent that the tooth must be removed, but the time of operating is a matter of much importance.

A number of deaths have been recorded from immediate operations upon cases during the acute inflammatory stage. Brown states: "That the presence of micro-organisms in the blood appears to have demonstrated that the opening of blood vessels incident to operations for the removal of impacted teeth has allowed the direct entrance of septic matter into the circulation and converted septic intoxication into true septicemia." It may, however, not be always practicable to wait until the acute inflammation subsides, because the danger involved from continued progress of the inflammation and infection may absolutely force drastic measures, even though they be adopted with full knowledge of the danger.

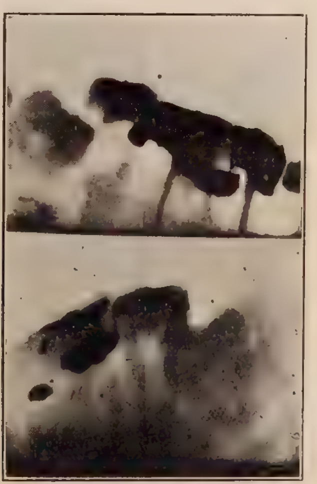


Fig. 4 shows restorations of distal surface of second molar.

The operation for the removal of the impacted lower third molar, in the writer's opinion, has been held altogether too lightly by the general practitioner of dentistry, as well as the general practitioner of medicine. This operation under the most favorable conditions is not performed without some attendant danger. The first is the inspiration of blood which may be sufficiently profuse to fill bronchi and flood the lungs sufficiently to cause fatal termination. Second, inspiration of even a small quantity of blood with bacteria-laden saliva may lead to inspiration pneumonia. Third, the immediate loss of blood, if unchecked, may seriously deplete the vitality of the patient. The danger and difficulties attendant upon the management of a bleeder with wounds of this nature are serious. Fourth, the danger of fracturing the jaws during the operation is one that must not be overlooked, and great care must be exercised in some of these conditions that undue stress is not laid upon the tooth in the effort to remove it.

The first principle in the removal of impacted lower third molars is that the surrounding bone, which may seriously interfere with the amount and position of the bone incapsulating the tooth can be definitely ascertained only by means of the radiograph. (Fig. 6). The writer always insists that a good radiograph be obtained before attempting the operation.

The radiograph will show definitely just what has to be done, showing the position of the roots, the size of the tooth and the extent and character of the impaction. In other words, it shows definitely just what has to be done in order to accomplish the successful results which are demanded, and the operator is culpable who attempts this operation without a positive and definite aim in view in every step of the operation.

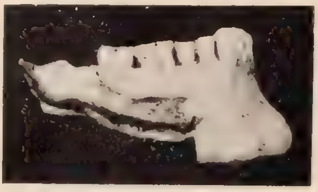


Fig. 5.

In the writer's hands the surgical mallet and properly formed chisels (Fig. 7) have been the most successful instruments for removing the bone surrounding the impacted tooth. By the use of these instruments the land marks in the field of operation are not destroyed as they sometimes are by the use of the dental engine and bur. After chiseling away the bone above and posterior to the tooth, the chisel is driven down between the tooth and process on the buccal side and the process pried away from the tooth. A small section of the process is then chiseled away between the impacted tooth and the distal surface of the second molar until sufficient space has been secured to insert the point of a spade elevator; then by rotating the elevator slightly, if a sufficient amount of bone has been removed from the upper surface of the tooth, a little effort will dislodge it. By this method clinical experience has proven that less traumatism has been made to the field of operation than by any method which has yet been brought to the writer's attention. In looking over the literature on this subject many misleading articles are to be found. Some have been written by medical men without dental training. It is often quoted and the practice is in vogue, "that it is good practice

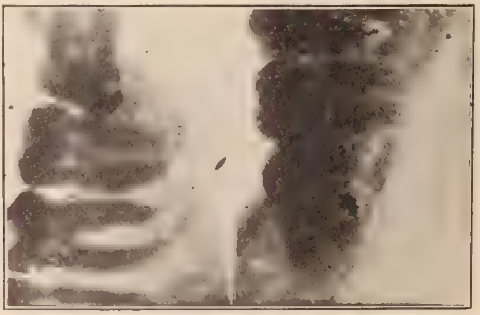


Fig. 6.

to extract the second molar for the purpose of removing the impacted third molar." The writer wishes to go on record as stating that in his opinion it is *never* necessary to sacrifice the second molar in order to remove the third and such a practice should be emphatically condemned.

A mistake which is often made too by reputable men, in the operation for the removal of impacted teeth is, that the post-operative treatment is neglected and many times overlooked entirely. A good general surgeon would never make a wound in the human body of the extent and character of the wound made by the removal of the impacted lower third molar and expect nature alone to care for it and make complete repair. Neither should we in this operation. After the operation has been completed the wound should be kept as sterile as possible. Iodoform gauze packed lightly into the cavity immediately after the operation and changed every 24 hours for three or four days and the wound sprayed thoroughly after removing it each time with a good antiseptic solution will yield good results. Surgical cleanliness should be observed at all times throughout both the operative and post-operative treatments, if good results are to be expected.

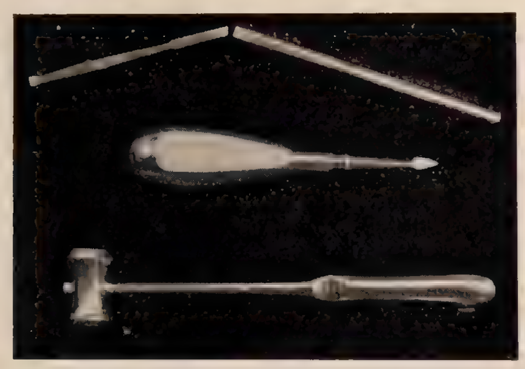


Fig. 7.

From the standpoint of humanitarian surgery a general anesthetic in these operations is most desirable. From the nature of the tissues of the field of operation a local anesthetic is usually not satisfactory, particularly if acute inflammation is present; and in the large majority of cases where an operation is indicated the tisues are in a pathological condition. The writer's preference in the anesthetic to be used is ether. The ether anesthesia provides sufficient time to accomplish just what is necessary without any undue haste, and the results are eminently enough more satisfactory to justify the inconvenience of the patient in taking the anesthetic.

Nitrous oxide and oxygen is a satisfactory anesthetic for this purpose, providing the anesthetist is skilled in its administration. It is more agreeable to the patient, but it takes more skill and experience to administer than does ether, and the average hospital, where these operations can be performed most satisfactorily, is not equipped, as yet, with a modern appliance for the purpose, neither is the average anesthetist skilled in its use. No doubt the day is not far distant when nitrous oxide and oxygen will be the anesthetic of choice in all of these operations.

In closing, a word of emphasis will not be out of place regarding the operation for the removal of the impacted lower third molar.

First. It is not a simple operation and should not be so considered. If the dentist will impress this upon his patients, it will greatly aid those who are doing this class of work.

Second. A radiograph should always be had before beginning the operation, that it may be known definitely just what will be required.

Third. Have a definite aim in view in every step of the operation, so that the least amount of traumatism will be made to the surrounding tissues.

Fourth. Surgical cleanliness must be maintained throughout the operation if we expect to succeed.

By observing these principles we will place the operation for the removal of the impacted lower third molar on a scientific basis, and thereby remove it from the operation of merely extracting a tooth.

DISCUSSION.

DR. C. H. OAKMAN, Detroit: I believe this subject, ''The Impacted Lower Third Molar,'' to the profession as a whole, is of the utmost importance. There is nothing in the practice of dentistry that should give the operator more concern, especially those coming under the head of *third degree* impactions, where the tooth is invisible.

A radiograph might show the impaction to be in the ramus or the angle of the jaw, or so situated that a considerable portion of the impacted molar is imbedded or agglutinated with the distal root of the second molar, or where the tooth lies at right angles. A poor radiograph may accentuate the abnormality, thereby misleading the operator, so it behooves us to have X-rays taken by those most expert in that line of work.

My experience has proven that it is not always the position of the tooth that makes it difficult to remove but the composition of the structure of the jaw. And that we can not tell until we begin to operate. Some of the most difficult teeth I have removed are those which did not appear extremely so before starting to operate, but were found to be in the jaws where inorganic substance was greatly in excess of the average.

We know that in the removal of impacted lower third molars, serious results have occurred. Teeth that appear in the angle of the jaw require the greatest care. I operated at a clinic on one so situated and where the tooth extended almost the depth of the jaw. In this case it was a physical impossibility to remove the tooth without dividing the jaw. It was an experience one could not soon forget. I might compare it to that of the Irishman, who, having twelve children, was asked what he would take for one of them. He said, ''I would not sell one for a million, but I would not give fifteen cents for another.'' While my experience was valuable I would give no more than the Irishman for a second one.

Men who have done considerable of this work must necessarily come in contact with all kinds of cases. The more we do of it the more cautious we become.

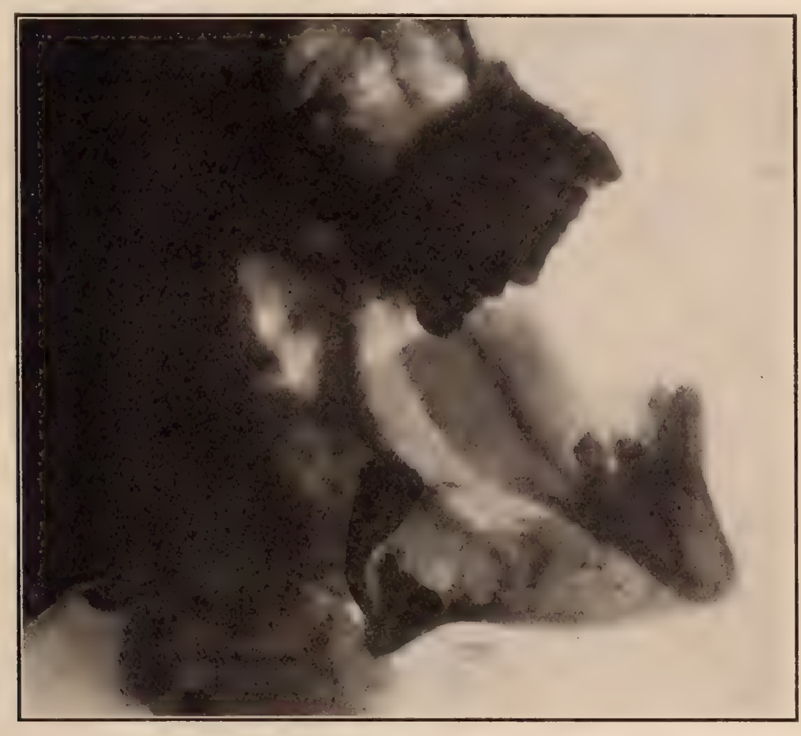
We know, too, that the irritation caused by an impacted molar has resulted in the formation of malignant growths. While the etiology of cancer is not definitely known, yet it is quite generally believed that irritation is a causative factor. So it is my practice to remove these impactions as soon as possible.

HISTORY OF A CASE

Mrs. S: age 36 years, came to this country from England about six months ago. Little attention had been given her teeth and there were no subjective symptoms; but upon examination I found a tumor near the angle of the jaw. It was not sensitive to the touch but on palpation it appeared to be of a cystic nature.

The patient had been pregnant about two months and I thought it wise to operate at the hospital, which I did.

The tumor was removed and sent to several pathologists for examination. Lastly to Dr. Warthin, of Ann Arbor, whose diagnosis was Bone-marrow Sarcoma.



Bone-marrow Sarcoma due to irritation caused by impacted lower molars.

You will notice by the accompanying cut that one of the impacted molars rests well upon the ramus, while the crown of the other is situated low in the angle, the roots of which extend almost into the neck.

After removing the tumor, the parts, being of a somewhat spongy nature, were thoroughly curetted.

The lower molar could not be reached from within the mouth, so a small incision was made externally at the angle of the jaw. It was difficult to cut the tissue at the apex of this tooth but by the use of a mallet and chisel the tooth was driven upward into the cavity from which the bone had been curetted. The external wound was then sutured with horse hair and the scar was nearly invisible.

This case was difficult from the fact that two teeth had to be removed from near the angle. Had the jaw been divided it would have been extremely unfortunate, the patient being pregnant, which would have necessitated locking up the jaws for a month, thereby depriving the prospective mother of the nourishment for herself as well as for the well-being of the fetus.

The continuity of the jaw was maintained and the patient made an excellent recovery, which I must confess was a great relief to me.

I wish to differ from the essayist as to the use of an anesthetic. Very rarely do I find it necessary to administer a profound anesthetic unless it be a case where the patient is unable to open the mouth or in cases of pregnancy or highly neurotic persons. It is of utmost importance that the patient be in nearly an upright position, that the operator may get the best possible view of the field of operation.

I prefer to use a one-per cent. solution of cocaine combined with a saturated solution of chlorotone, fifteen grains of chlorotone having been administered one hour before operating.

When operating under local anesthesia there is no likelihood of the blood getting into the trachea or lungs as there is under a profound anesthetic. In the former the patient can be of great assistance to the operator as he can expectorate frequently, thereby eliminating a lot of sponging and the mouth may also be irrigated with hot water.

Before operating the mouth should be put into as hygienic a condition as possible with a wash of 70% solution of alcohol.

It is my practice to have in readiness about one dozen burs and drills, as it is sometimes necessary to use various sizes and shapes. Care should be taken not to use a larger bur or drill than is really necessary as considerable injury may be done to the surrounding parts by the injudicious use of instruments.

In certain cases properly selected chisels are of value, but I believe that the patient experiences more shock from the use of chisels than from burs and drills.

In the use of an elevator great care should be taken not to use too much force because jaws have been fractured by so doing.

If the operator be ambidextrous he will find it a great help as he can then drill almost on a direct line with the long axis of the tooth, thereby making it easier for the patient.

There should be no ragged edges on the bone. The parts being made smooth the tissue will readily granulate.

The wound should be swabbed with tincture of iodine, campho-phenique or phenol-sodique and packed with one-inch iodoform gauze. The first packing should be tight in order to lessen hemorrhage.

If there be no infection this dressing may be left in forty-eight hours, afterwards dressed every twenty-four hours, reducing the gauze a little each time so as not to cause pressure on the parts. After the first dressing, in cases where the patient objects to the taste of iodoform, borated gauze is substituted.

If for any reason there be considerable after-pain that is not easily relieved by opiates, the inferior dental nerve should be injected with a solution of cocain, alcohol and chlorotone.

There being no infection, hot applications may be used. however the same results will be obtained by the use of cold application (ice bag), sometimes the latter proving more beneficial. Also frequent massage of the jaws has given most gratifying results, at the same time reducing the swelling.

The after-treatment is of utmost importance. Iodine we know to be one of the best agents for disinfecting the skin or mucous membranes, especially if the parts be dried.

A mild antiseptic wash should be used every two hours.

Opiates which may be taken for pain are aspirin, codeine and in some cases morphine may be given.

Caution in regard to the latter drug as it is well that the patient should not know that morphine has been prescribed.

Dr. S. Straith, Detroit: Because of the noisy, ambitious salesmen and anxious (?) customers in the rear of the hall I have been laboring hard trying to hear the essayist and the discussions; so, if in an effort to make *myself* heard, I raise my voice too high, you will forgive me. (From the audience) Go as far as you like!

I do not want to attempt at this time to make an impromptu speech. I received a copy of Dr. Lyons' paper a few days ago and last night I tried to put some notes on paper that would possibly sound better than if I would attempt to say something off-hand. I have often found that when I have attempted to say things off-hand, when I am through, I have failed to say some of the things I most wanted to say, and would have left unsaid others which I did say.

The discussion of society papers usually resolves itself into a series of compliments for their authors and it is the exception when many criticisms are offered. The reason for this may be, and probably is, because there is so little to criticize; but in some instances we hesitate to take exception to statements made, either through friendship or consideration for the essayist, or because of the study he has made of the subject which fortifies him to defend any position he has assumed. The statements made are usually prompted by results of practical experience or preparation and deserve much consideration before attempts are made to refute them, unless they are so radical as to require proof of their genuineness.

In looking over the paper and then hearing it read I notice that I am so in accord with the writer and his thoughts expressed that I fear I am in the position of the man finding himself in the company of a learned judge who tried to engage him in conversation along different lines. The man happened to be of the type who always agrees with you, answering ''yes'' or ''no'' as he thinks will best please you. In this particular case the judge began the conversation with the usual salutation—''fine day, isn't it?'' ''Yes, fine,'' came the response. The judge then tried him on farming, politics, business, religion, and many other subjects and all the reply he could get out of his friend was ''yes,'' ''exactly,'' ''fine,'' ''that's right,'' ''just so,'' etc., until the judge, becoming exasperated, said to him: ''For heaven's sake, man, say NO sometime, so I will know there are two of us.''

Now I am afraid if I were to tell Dr. Lyons wherein I agree with him, he would feel like telling me what the judge told his friend. Many times I have tried to say some of the things Dr. Lyons has said, but it occurs to me they have not been said in such a tactful or diplomatic way.

In attempting to do my duty along most any line, my universal practice has been to call a spade a ''spade,'' when some other name by which it is known might not brush the hair the wrong way, and more lasting impressions possibly be made.

The extraction of a tooth has been looked upon as too trivial an operation to require any particular skill or equipment, and in the majority of cases it would seem that practical experience might bear out such an assumption; but the dentist who has not, at some time, had a sudden awakening and been forced to acknowledge that some extractions, which appeared very easy of accomplishment, have been bitter disappointments to him—has either done very little extracting, or else he has more ability as an extractor than I have.

The prevailing opinion among the laity as to the simplicity of the operation of extracting has been forced upon him, because of the attitude of the dentist, and his failure to educate them differently.

I never could quite understand why the laity should not be educated to look up to and regard the dentist because of the work he has to perform, with as much respect as they show the physician or surgeon for the performance of the work that falls to him.

I *can* understand why the extraction of an impacted tooth is not considered either serious or difficult, by the laity, because they have been permitted to place such a small value upon a tooth, that the first thought entering *their* minds is toward the removal of *any* tooth, be it sound or otherwise, that will make the extraction of the impacted one more easily accomplished. Thanks to later education, the fallacy and injustice of such an idea is rapidly being dispelled.

Of something over 6,000 teeth extracted by myself during 1912, about 600 were third molars, nearly 100 of which were in a less or greater degree of so-called injustice of such an idea is rapidly being dispelled.

In talking with patients referred to me, it is the exception, rather than the rule, that the seriousness of an impacted tooth or the difficulty of its removal has been suggested to them by their dentists. On the other hand, it is more often made light of, some excuse made for referring the patient, and a very long breath taken when the responsibility is shifted to some one else. There, now, I have been calling a spade a ''spade'' again.

I wish I had the power of speech or the command of language to say these things more as I mean them; to be taken as suggestions rather than criticisms.

In explaining these conditions to our patients it is not necessary to make them feel that the time for making a will has come, or that the ambulance will be waiting for them when the operation is completed; but the way for the operator may be made much easier if, by being frank with our patients, and honest with ourselves, we try to share each other's burdens, and in so doing we are educating the laity to a greater degree of respect for us and our profession.

More than once, surgeons who have accompanied patients to my office for the removal of impacted teeth have said to me during the operation, ''Doctor, you are welcome to your job; I would rather amputate a leg or do an appendectomy than to do that operation.'' This was not because of strength necessary to do the operation, but because of skill required and for responsibility assumed. Let us presume to ask a fee for our operations such as the surgeon will get for his and we may prepare for trouble. The reason for the lack of appreciation for our services lies with us and not with the laity.

I wish I could more strongly emphasize what Dr. Lyons has said about the necessity for a radiograph to assist in the removal of an impacted tooth. However, I find myself, very often, refraining from recommending this procedure, thereby causing uncertainty and disadvantage to myself, through financial consideration for my patients.

Fortunately, or unfortunately, I have never been possessed of wealth, knowing full well the value of a dollar, and am prone to consider conditions or circumstances about my patients that suggest to me the hardships or inconvenience which they might be caused by the extra expense of a radiograph.

It may be that we have troubles enough of our own without thinking of the other fellow; but there is danger in being too inconsiderate of our patients' financial ability to meet other than absolutely necessary expense.

If there is any position taken by the essayist which, in my opinion, might be assailed, it is in deferring the extraction of an impacted tooth.

I believe my experience of over ten years of limiting my work to extracting only, will bear me out in the assertion that more mistakes are made by too long retention of abscessed as well as impacted teeth, after trouble has manifested itself, than by their early extraction.

It is somewhat amusing to me when patients, after continued suffering from a badly swollen face caused by an abscessed tooth, come to me in sheer desperation, for relief, but with strict orders from their physician not to have the tooth extracted, through fear of ''blood poisoning,'' that these same physicians would freely open the abscess by lancing. It occurs to me that fewer blood vessels would be opened up with an ordinary extraction under such conditions than would be with a free incision, and consequently less chance for the entrance of septic matter into the circulation.

Notwithstanding my preference for nitrous-oxide and oxygen anesthesia for ordinary extractions, I am forced to agree with Dr. Lyons in recommending ether as the anesthestic for the removal of impacted lower third molars.

My experience with nitrous oxide oxygen justifies me in recommending it to the oral and more particularly to the general surgeon for almost any operation in surgery—when the surgeon is not to be his own anesthetist, or when he has an assistant well qualified to administer the anesthetic; but, when the surgeon is to be his own anesthetist, or must closely supervise the anesthesia, he must be exceptionally expert both in surgery and as an anesthetist, if he does justice to himself or to the patient. I believe I am justified in saying that my work with nitrous oxid and oxygen anesthesia has been quite successful; but when I have a difficult extraction of an impacted tooth, I prefer ether anesthesia because it is quieter and more stable; I am relieved of much of the responsibility, and can give my undivided attention to the operation.

In attempting the discussion of this paper, I did not intend to say so much, and yet in reality I may have said very little; but the more I say, the more I want to say. I have touched upon only one phase of the subject. The etiology of the impacted lower third molar, and the pathological conditions incident upon its eruption and after its removal have been so well described that any elaboration upon it by me, if possible, would be superfluous.

The society is very much indebted to Dr. Lyons for his splendid paper, and should we get nothing further from the meeting we must feel well repaid for any effort or sacrifice to get here.

W. A. GIFFEN, Detroit: A dental radiograph showing the position of an impacted third molar may be very misleading as it is sometimes a difficult matter to get the rays directed towards the film or plate at exactly the right angle to avoid distortion and it requires considerable experience to make an accurate radiograph, especially if there be much swelling of surrounding tissues.

I agree absolutely with the speakers's statement that the second molar should never be removed in order to make the operation for removal of the third molar easy.

In cutting away the bone I use special heavy surgical burs. I believe when patients have reached the age of twenty-five (25) years or more the bone is so dense in structure that the work of cutting it away with chisels is too strenuous for both patient and operator.

Owing to the fact that such a large percentage of the cases is in such a condition of irritation that the inflamed tissues cannot be completely anesthetized with a local anesthetic prepartiaon, it becomes necessary to administer a general anesthetic. Also the patient must be anesthetized for a greater or lesser period of time. To my mind, nitrous-oxide and oxygen is the proper agent because all the time needed can be had. Also, it is safer than any other anesthetic when properly administered. The patient can be kept in a reclining position so that the field of operation can be plainly seen, the throat sponged out with gauze and the mouth propped open. The patient breathes through the nose only and very little, if any, blood will be swallowed.

There is no objection to taking the patient to a hospital, but the operation can be done better in a dental chair than in any other position.

Regarding after-treatment, there is usually good drainage so cleanliness is the important thing. I do not like iodoform gauze on account of the odor. I use formidine tape or adrenalin tape, as indicated, but no dressing should be left in the socket over one day on account of fermentation.

E. T. LOEFFLER, Ann Arbor: Operations for the removal of impacted lower third molars have been under my supervision ever since I have been engaged in college work. However, for the past two or three years this particular work has been directly in charge of Dr. Lyons and, I can assure you, to the satisfaction of all concerned.

The operation for the removal of impacted lower third molars has been very much underestimated. I would like to emphasize the fact brought out in the paper that the laity as well as the profession should be more seriously impressed with the nature and importance of this part of the dentist's work. Dental faculties, especially, should take pains to see that their students are thoroughly impressed with the seriousness of this operation, so that as they go out into practice they won't feel inclined to consider this a part of their regular work, but rather that of a specialist.

They should be taught that such work should be done in a well-equipped operating room and that the patient should be examined and prepared as for any major operation, and that the fee should never be less than $25. (By Dr. Oakman)—''Not less than $100.'' Dr. Oakman tells me that the fee should never be less than $100. When the profession thoroughly understands the situation the laity will readily fall into line. We must do this much for the welfare of our patients.

Fifteen years ago the average dentist did not hesitate to correct or attempt to correct the most difficult case of malocclusion. Today the student is taught to refer such cases to the orthodontist, who has had special training to do such work. The same thing should be done in regard to operations above referred to.

Another point that should be thoroughly considered and that is the question of hemorrrage. Occasionally we meet with a case of profuse and sometimes persistent secondary hemorrhage which the average practitioner is not able to handle unless he has made some special preparation. A well-equipped hospital is the best possible place for such patients, where they can be kept quiet and receive proper attention.

The essayist has covered the subject so well that very little discussion seems necessary. However, there is just one more point to be emphasized and that is the question of securing a good and accurate radiograph. The work that I have done along this line has taught me that to obtain a good radiograph of a lower third molar, impacted or otherwise, is the most difficult work the radiographer has to do. The location of the tooth, the sensibility of the tissues, difficulty in holding the film and especially to prevent motion while making the exposure, are points that require special attention. By all means insist on getting a good radiograph.

Dr. C. J. Lyons (closing): The question of proper anesthetics has been raised, and rightly so. From the standpoint of humanitarian dentistry, as I say in my paper, I believe that in these operations, that a local anesthetic is not sufficient. I do not believe we should insist on our patients taking local aneshetic when they can have it done under nitrous-oxide and oxygen or ether very much easier and a great deal more satisfactory to the patient.

I believe the hospital is the only place to do this work successfully, or by someone who is making a specialty of this work and has everything necessary in his office. Dr. Straith's and Giffen's offices are equipped, but the average dental office is not equipped. Then the hospital is the place for those patients and at the present time, ether, in my judgment, is the proper anesthetic on account of the average hospital not being equipped to adminster nitrous-oxide and oxygen properly.

Now, just one more point, and that is regarding the use of the chisel and the mallet, or the bur. This is simply a matter of personal equation. In my hand the mallet is the most satisfactory. It is very difficult for me to tell whether I am cutting into the bone or roots of the teeth when I am using the bur. I have seen a great many operators who did not know where they were cutting, but with the chisel you know with every stroke just what you are doing. With the aid of the skiagraph I am sure I get much better results with the chisel and mallet than I would with the burs. Thank you!

As a rule, no root anterior to the second bicuspid should be crowned with an all-gold crown. None of the incisors or canines should show any but a porcelain surface.—*Burchard and Peeso.*

THE RESTORATION OF WRECKED MASTICATING ORGANS.*

BY HENRY W. GILLETT, D.M.D., NEW YORK CITY

THE GENERAL LINE OF ARGUMENT I shall present for your consideration is in advocacy of the establishment in all cases of mutilated and pyorrhetic masticating organs of the best possible sanitary conditions and the most efficient functional conditions. I shall propose two definite operative procedures with reasons for them and present a statement of the principles on which they are based.

I desire to forestall here one point that is likely to be made in discussion—namely, that the full accomplishment of what I am about to advocate is possible to only a limited portion of our clientele and of the practitioners of our profession. This I unhesitatingly acknowledge as a fact, but I hold it to be an ineffective argument as against the wisdom of formulating and advocating the most efficient plans possible for the attainment of the desired end.

I also further reply in advance to this mythical critic that he has no means of knowing how our clientele will respond to a need once it has been made clear to them. I predict that when the dental profession or its more active third "finds itself" on the two lines I desire to emphasize, and is able to say, with that assurance based on the certain knowledge of facts which invariably carries conviction to the hearer—your continued health, even your life depends on the elimination of these ill conditions and the establishment of a better state of affairs, then there will be the same acquiescence from them as in the case of the surgical operation necessary to continued life and health.

While I recognize the great importance and possibilities of orthodontic treatment of adult malocclusion cases, I shall avoid reference to such cases not dependent on mutilation in order that the discussion may not drift towards orthodontia; and for a like reason I shall endeavor to focus my reference to pyorrheal conditions, so far as possible, upon the so-called post-operative procedures, so we may not get lost in the mazes of a general discussion of pyorrhea.

As primary conceptions, around which my thoughts have gathered, I desire to call to your attention that for generations our profession has too often been content to make good bridges, crowns, fillings and inlays without sufficient consideration of their relation to the masticating organ as a whole; that we have too often exercised our ingenuity to retain individual teeth incapable of restoration to efficiency or sanitary condition long after they have become a menace to the life and health of the owners; that we have too often focused on the tooth and too seldom on the organ of which it is a part; and that the post-operative details are the ones now most in need of practical solution in the cure and maintenance of cure in advanced pyorrhea.

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*Read before the Northern Ohio Dental Society, 1913.

The elimination of vicious occlusal stress, the establishment of conditions of mutual support for weakened teeth, provision for maintenance of cleanliness by the patient, and efficient functioning of the masticating organ, are essential features of the cure of advanced pyorrhea, and the pyorrhea specialist who looks for permanent success must find a way to deal with these factors.

I want to focus your attention on the masticating organ as a unit and in preface to call up in your minds a series of pictures familiar to every practicing dentist.

First, I ask you to recall the many cases you have seen where the progressive changes in the relation of the teeth and jaws following extraction of one or more teeth has resulted in a malocclusion and a ''locking of the bite'' entirely preventing efficient grinding movements.

Also call to mind the many instances in which such cases have been further complicated by the lesions of pyorrhea involving the loss of so much of the gingivae and the alveolar process as to render abortive all efforts of the patient to maintain a proper degree of cleanliness.

It is to the means open to the general practitioner for correcting such ill conditions and to certain underlying principles concerning these remedial processes that my remarks will be chiefly addressed.

In order that we may approach our subject intelligently let us first glance briefly at some of the leading factors of the problems presented by the class of cases to which I have referred.

It is unnecesary before this audience to establish the fact that the malrelations of jaws and teeth following the loss of a single tooth, especially if this loss occurs in early life, may, and often do, result in an impairment of efficiency extending even to the total prevention of lateral grinding movements of the mandible leaving the subject only the incising and crushing functions.

It is, however, my belief that we may wisely consider with care the grave results of such inefficiency of the masticating organ so we may ourselves grasp clearly the fact that there rests upon us an imperative duty in such cases which is too often shirked; that we may be better able to so array our facts before the subjects of such disability as to present a convincing picture of the benefits to accrue to them by well-planned remedial measures, and that we may more surely realize the need for a carefully prepared plan of operation based upon a study of the relations of all the teeth to each other in every case of the type we have under consideration.

To consider in detail the results of inefficiency of the masticating organ in the comminution of the food would involve an undue extension of my remarks even if I felt competent to attempt it. I feel that it is sufficient for our present purpose to note that mouth digestion of ingested food is the initial step of all normal nutrition and it seems axiomatic that so complex a process as the nutritional function can not possibly proceed along normal lines if its initial step be imperfectly or improperly performed.

It will be easy for the one who doubts this statement to find in the later scientific writings on the various phases of the subject and from ordinary observation, evidence that general inefficiency and disease follow with great regularity where the all-important initial digestive step is incompletely performed.

Logically this must be so, since it means failure to present the ingested nutriment material to the assimilating organs in the form best adapted to the exercise of their functions, and since it also means loading of all those portions of the digestive tract which retain for any prolonged period the ingested food or its partially digested resultant during its progress from ingestion to excretion, with material which, at best, is a burden to the mechanism, but which under average conditions must undergo putrefactive processes which result in presenting to the assimilating organs products harmful and poisonous rather than nutritive.

If the main points of this outline be accepted then no argument is needed in support of the statement that every case presenting to the dentist with a mutilated masticating organ must be considered a grave one, and that its presentation imposes upon him the imperative duty of a careful study of the masticating organ as a unit before he determines his procedure with regard to an individual member of that organ.

As to the manner of the operative detail of this study, I have a definite suggestion to make, but before proceeding to that feature I desire to go back to the picture I asked you to call up of the cases complicated by advanced pyorrhea. Here again we have a factor gravely influencing the general health of the subject, and one concerning which there is no longer a reasonable excuse for apathy or inactivity on the part of the general practitioner of dentistry.

That foci of pus infection are frequent causes of grave functional disturbances and organic lesions in the human system is so well established that to emphasize the gravity of the relation of pyorrhea to our professional labors, it is only needful to comment that such foci in the mouth seem even better calculated to induce harmful results because of their location than do similar foci in most other parts of the system.

Their frequent association with movable teeth and the likelihood of forcible injection of bacteria and bacterial products into adjacent tissues and the blood stream, when such teeth are driven into their sockets by closure of the jaws has been well emphasized by Dr. T. B. Hartzell.

The gravity of these possibilities is such as to impose upon the dental practitioner an imperative duty in the elimination of such foci and in the maintenance of conditions which shall not foster their recurrence.

Fortunately we have arrived at a point in our professional development where wide-awake practitioners no longer advance the tenet that pyorrhea is incurable, and where it is an accepted dictum that a sanitary artificial substitute is better than a diseased natural organ.

It is upon this foundation that I shall base the suggestions I shall make to you as to operative procedure, in which I shall go even farther than I have just indicated, and advocate the use of substitutes for portions of organs sanitary in themselves, but conducing to insanitation of adjacent tissues or to inefficiency and disease of the masticating organ as a unit.

We now come to the detail of certain procedures I shall suggest in the practical solving of the problems confronting the operator when a case of the type we have in mind presents itself to him for advice and treatment.

The first step in such cases should be the obtaining of accurate impressions of the mouth and the making of plaster models that shall duplicate the existing conditions. With these a careful study of the case should be made, and only after such study should the restoration of any part affecting the occlusion or the relations of individual teeth to other teeth be undertaken.

In this connection I ask you to run over in your minds the cases where you have made bridges or crowns that were excellent individually, but which later reflection has convinced you were of little value to your patients, because the opposing tooth or teeth were so elongated or were so tipped out of alignment as to result in relations of your bridge with their occlusal surfaces entirely preventing lateral masticating movements.

It is my contention that not only is the above description true as regards many a piece of work most excellent in its detail of mechanical construction, but I would go further and say that I believe many of us have placed bridges of which we were proud at the time, which have not only failed to be of benefit, but where the patient would have been better off without any bridge than to have had the one we supplied. The orthodontists have taught us that there is no safe way to start an orthodontia case except by study of the models. I submit for your consideration the statement that the prosthodontist cannot, in cases where teeth remain in situ, safely and wisely formulate his plans without their aid.

The plan should be so formulated that the completed work will have no avoidable inharmonious element, and that the nearest possible approach to normal occlusion shall be realized.

If the work of extensive cases be begun and continued in this manner the different elements of a complex case may, if necessary, be inserted at long intervals without resultant inharmony.

In case of need for opening the bite there is introduced a factor usually demanding the insertion of all the parts at one time in order to safeguard the principles laid down, but sometimes temporary devices may be made to serve for part of the work until conditions favoring its completion are at hand.

It is self evident that adherence to the principles advocated, involves the shortening of all extruded teeth and the restoration of the occlusal planes of all displaced teeth to a line in harmony with the general occlusal plane.

I now desire to take up the class of cases where we are likely to have all the conditions due to early mutilation, plus the loss of so much of the tissue adjacent to the teeth from the ravages of pyorrhea, as to result in areas between the teeth and possibly between the roots of molar teeth, impossible with any feasible and reasonable expenditure of time and effort for the patient to keep in a condition that will not invite the return of active pyorrhea, and that will not be a menace to his welfare on the score of insanitation.

We will assume that the active pyorrhea has been eliminated by curing where feasible, and by removal of all teeth where the lesions had been so extensive as to demand that procedure.

Such being the case, let us spend a moment in summing up the situation and in considering the ends we desire to attain. In our typical extreme case we have a mutilated organ in which the remaining teeth have been weakened as regards attachment to the jaw, by the inroads of disease. Therefore, our *first* aim is to conserve all the remaining strength of each tooth deemed worthy of retention; our *second* is to do this along lines that shall not only permit, but shall promote the maintenance of continuous, healthy conditions by the patient at every point, but particularly at the gum margins; and *third,* we desire to restore an occlusion efficient for the thorough mastication of food.

Under the conditions of our typical case, health of remaining natural tissues and organs and efficiency of the masticating organ as a unit have become the paramount issues—they overshadow all considerations of sentiment, as to the retention of natural organs which shall interfere with their realization.

Just as teeth which have become so diseased as to be a permanent menace to the health of the subject should be removed, so portions of the teeth which gravely menace continuance of the restored local health or which prevent realization of efficiency of function in the organ of which they are parts, must be treated in the same way.

Let us consider a case where clearing away of the hopelessly diseased parts has left but a few teeth in either or each jaw, either scattered about or the six front teeth standing together, where there is a pronounced tendency to the collection of sordes, and where the absence of the septa and the relation of the teeth prevent efficient cleaning by the patient. In such a case is there any hope that the three objects enumerated above, conservation of all remaining strength, maintenance of continuous health of soft tissues, and restoration of occlusal efficiency can be attained and maintained so long as the crowns of the teeth in such a jaw remain in situ to interfere with the patient's cleaning efforts, and by the malrelations certain to exist, preventing the fruition of the prosthodontists efforts?

My own answer is that there is no such hope; and with the courage of my convictions I have proceeded to cut to the gum level all the teeth in jaws in such a state as I have described. After this has been done, the neatest possible fitting copes are prepared for each root end. These copes are united either in sets of two or more (often all the copes in one jaw are united together) and the selected measures for retention of the removable bridge pieces are mounted on the resultant appliance.

By this procedure I have succeeded in several cases in attaining all the three desired objects above enumerated.

The strength of each individual root and of all the roots collectively has been conserved by uniting them so they get mutual support, and by using a removable appliance the leverage stress upon them has been materially reduced.

I desire to direct your attention more particularly to both the points mentioned in the last sentence. You will note that by the procedure indicated, all the advantages claimed for fixed bridge work as regards mutual support and fixation of individual roots have been realized. I am not sure whether this difference in leverage stress has received attention in our literature, but it is my contention that aside from the greater latitude frequenly given the operator in the arrangement of the occlusal planes in a removable piece, there is a further advantage in the shortening of the lever through which the stress is directly applied to the root attachments, and from the fact that the joint between the fixed and removable parts of the bridge serves to ease the lateral thrust upon the roots. .

A condition has thus been established leaving no excuse for inefficiency in the cleaning operations of the patient because the brush and other cleaning devices can be applied directly to the weak point in all incipient pyorrhea, the gum margin where the lesions begin. Furthermore, all the gingivae can receive the vigorous friction so valuable in stimulating a healthy blood supply. Some qualification is perhaps desirable here to allow for the fact that the bars uniting the copes cover a limited area of gum so as to render it less accessible to the brush. In practice I do not find this a disturbing factor.

By the described procedure, there has been eliminated from the jaw under consideration every impediment hindering the prosthodontist in the establishment of normal occlusal lines in that jaw.

I am aware that this suggestion of cutting possibly sound teeth to the gum level will seem radical to many of you, and I anticipate that it may stir some of you to drastic criticism; but my experience with them has been so satisfactory that my faith in the value of the principles underlying the procedures described has grown stronger with each successive case.

In my first case of this type the system of retention advocated by Dr. John L. Kelly, of Chicago, was used in a full lower continuous gum denture retained on the roots of eight teeth including the separated roots of one molar.

After two years of practical service, I am able to say that nothing in my professional career has given me greater satisfaction than its entire success in realizing all the three ends I have emphasized.

In later cases, I have had much satisfaction in the use of the principles of retention advocated by Dr. Steele F. Gilmore.

The stability and efficiency of the substitute with this type of anchorage in difficult conditions is most satisfactory. For example take a case recently completed where the six upper front teeth and one first bicuspid remained standing, and another where the lower bicuspids and laterals only remained, and in such position that there was no possibility of correct occlusion with the upper piece. In both these instances the anatomical restoration was effective from the first day's use. In the lower this was the more notable, because of the almost complete absence of alveolar ridge in the molar region.

My experience in such work has been confined to cases where platinum or gold bases have been used, the former with all porcelain restorations, the latter usually with rubber attachment for the teeth, but both in complete and partial cases the result has justified my faith.

I now approach such cases with the comforting sense of certainty of my ability to conserve every factor of strength remaining in the weakened organs, and of assurance that the patient can maintain a condition of health after my work has been done.

I commend the principles involved to your careful study.

DISCUSSION.

Dr. J. F. Dougherty, Canton, O.: Although the subject interests me greatly, I have not found time to give the paper the study it deserves. I have been working along this line for years. It was recently my privilege to see a case where I had inserted a fixed bridge on teeth which were very loose. I think most dentists would have extracted at once. The lady was an old friend of ours, and I ventured to make the bridge, not wishing to hurt her by extracting the teeth. The case seemed a desperate one, however, and I had finally to extract four or five of the worst teeth. I had then to depend largely on a single molar of which the palatine root was exposed, and the buccal roots denuded. I made a gold crown to fit that tooth. I think now I might have done still better had I treated each root separately, after Dr. Gillett's suggestion.

Another case: teeth very loose; central incisor, cuspid, and molar on the right side; first bicuspid and molar on the left side. The patient was very anxious to have these teeth saved. I cut them all off and treated the roots. Paid special attention to securing best possible conditions favoring sanitation. Then I made a saddle bridge, which has been very satisfactory. If, however, I were doing that today, I should use a removable bridge. I have made, recently, much removable bridge work. I think the Gilmore attachment one of the coming things in dentistry. I believe it will be common in the future of removable bridge work, and that in using it, we will be rendering our patients a much better service. There can be no doubt as to the superiority, from a sanitary point of view, of removable bridge work. The bar used in the Gilmore attachment interferes very little with the matter of cleansing.

In using this or similar appliances, great care must be had in accurately fitting and adjusting the root-capping. The roots must be cut right down to the gums, or irritation will be caused by the bar. That appliance will be infinitely more satisfactory to the patient than a fixed bridge, principally because of superior cleanliness. I regard a fixed bridge, a large fixed bridge, as very unsanitary. The best bridge made, in my opinion, is a saddle bridge constructed with a 24-karat gold, or platinum. With a bridge of that sort, the corrugated effect of a row of teeth can be simulated, which is much more gratifying to the patient, while at the same time there is very little surface for the accumulation of food.

I regret that I had not time to give to this subject of Dr. Gillett's the attention due so able a document, and that I have not offered a more consistent line of remarks, for the subject is most interesting. The matter of saving loose teeth, teeth which the patient has fatally neglected, and restoring them to useful condition, is one of supreme importance.

Dr. W. A. Price, Cleveland, O.: I have had few opportunities in my life of enjoying greater pleasure than that afforded by listening to Dr. Gillett's reading of his admirable paper. It contains so much that is vital. I shall refer briefly to one or two points touched on, concerning his attachments, as compared with the fixed bridge.

There are a few essentials, prime requisites, never to be lost sight of. Unless we can secure sanitary conditions in these restorations, we might as well abandon our scheme at once. By this I mean we must devise appliances of such form that the patient can and will keep them clean. We need to avoid debris-accumulating surfaces. If you construct a fixed saddle bridge with a broad base, you have invited an unfavorable condition.

The stability of a bridge is not greater than its various foundations. The method Dr. Gillett has demonstrated probably insures as much strength as other methods employed for fixed bridges. By means of his expedients we may restore the arch to a normal condition and even use the natural crown on the bridge, if you can keep it moist while constructing the bridge.

Another point: if we compare attachments of a wide-based bridge with a narrow one, we find in the former three or four times as much surface which cannot be kept clean as in the latter. We are under the impression, some of us, that the removable bridge is, of course, sanitary, when, as a matter of fact, it may be and often is, thoroughly unsanitary. Take, for instance, the tube inserted in roots for supporting the pin attached to the bridge; if you would go to the trouble of opening that tube and spreading it out to its original flat dimensions, you would perceive at once that you have there a considerable area for accumulating debris. That cannot be reached and cleansed by a toothbrush, or by any except some special contrivance such as patients have not, and probably would not use if they had. That much, at least, lies against one form of removable bridge.

Dr. Gillett did not emphasize the possibility of using a combination of inlay-and-post attachment, thereby avoiding the cutting off of all the anterior teeth. Some might get the impression from the wording of his paper that he cuts off good teeth, which I am sure he does not.

The rule of attachment, as to the holding power of cement, is as follows: the power of attachment of cement increases in proportion to the square of the distance that the post goes into the root. If you use a short post, you have only slight attachment.

The weakness of the Gilmore system of attachment is that the bar wears out. Instead of that attachment, use a staple. This weakness Gilmore himself recognizes and he is furnishing a larger clasp.

Dr. W. G. Ebersole, Cleveland: I appreciate this paper more than any to which I have listened for a long time. Dr. Gillett has dealt with principles of restoration referring to the mouth including the teeth—restoration of expression, contour, facility of speech, and so on. Dr. Price, I am sorry to say, has confined his discussion to the one consideration of tooth restoration. Dr. Gillett has even asserted that the life of the patient might depend on the restoration of the masticatory surfaces of teeth. Not that I am quoting his words, but that seems to be what he meant.

Dr. Price has made his plea on behalf of a National Committee for dental research; meanwhile we are inquiring to know how we are to limit and control conditions daily met with in the mouths of our patients, requiring the organization of such committees. If we can secure conditions in the mouths of our child-patients, first of all conforming to nature's demand, we shall need no such committees to make investigations. It is true we have micro-organisms, and unfavorable conditions due to neglect, and to the bolting of food, and so on. Give me the children of today; let me teach them as they should be taught; give me these children's children—the children of tomorrow—and you will find in their mouths, years hence, no need for restorations. For God's sake, in your research work take, first of all, account of the need of prophylaxis. Give to humanity methods that the masses can use, and you will have accomplished more for the profession and for dentistry than you can accomplish in any other way.

Dr. H. T. Smith, Cincinnati, O.: On the general subject of perfect cleanliness we hear much, and read much. Uncleanliness of bridges, of plates, is much talked about; the matter of removing accumulations of food, is frequently referred to. But after all ordinary means have been employed, there often remains on natural teeth, plates and bridges, an accumulation of sordes, of which Dr. Gillett has made mention. Dr. Cook tells me he will dwell especially on this point in his clinic. Dr Cook uses special medication for the correction of this tendency. He has mentioned the sodium and potassium hydrates. These are recommended as especially useful for removing sordes. Unlike pumice or other abrasive powders commonly used, they are soluble in the fluids of the mouth, and so do not remain as an accumulation about the gingivae.

Dr. Cook: My clinic, to which Dr. Smith has referred, will, I hope, aid some to better understand how to clean the surfaces of teeth. It will not be such a wonder, I suspect. The treatment is directed simply to dissolving away mucous and tartar formations. It has some effect on tartar, but the earlier accumulations are those to which the treatment is especially directed. You can dissolve mucus in water, but a barrel would be required to dissolve even a little bit. The sodium citrate and the potassium hydrate will do the work well. A newspaper has quoted me as saying that nothing but water is used; the papers do not always get things straight.

Dr. F. W. Stephen, Cleveland: I am sorry this discussion has taken the course it has. The message that Dr. Gillett has brought to us is one that should most of all appeal to us as professional men allied with physicians and surgeons, not as mechanicians. I am glad the paper took the course it did; we are likely to forget where such men as Hartzell and James are exploring; we forget the first principle that Dr. Gillett has endeavored to make plain to us—that we have a machine out of order, yet a machine that cannot be put in order by recourse to a merely mechanical device. We must combine in our choice of means to restore this machine to good working order, intelligent regard for efficiency, utility, and sanitation.

Dr. Varney Barnes, Cleveland, O.: I have been greatly pleased with the paper. The cutting of the teeth, as advocated by the essayist, is apparently a somewhat radical operation; the man who does it is seemingly daring, yet it may, after all, be a conservative operation. If these operations are going to restore mastication, appearance, articulation, they can hardly be called daring. Such operations require much time, and consequently are expensive.

I understand Dr. Gillett advocates the use of casts for preliminary studying of his cases. A good cast made from a *plaster* impression, is requisite. The first thing most of us do in examining a case is to reach for our mouth-mirror. We are apt to forget that the *entire mouth must be examined.* We examine the occlusion of a few teeth and say, "that seems good," but after all, such casual examination will not answer; we must take an impression, make good casts of both arches, and look our case over very carefully and critically before we are prepared to advise or take action. That is one of the great faults in dental practice generally—going ahead, assuming responsibility, without having made necessary preliminary investigations.

I believe it is good practice to cut off loose, wobbly teeth, and make restorations above and over them. Such teeth are irritants to their supporting membranes and gum tissues. The mastication by such teeth is faulty; food, instead of being deflected away from the tissues, is driven onto them, and into the spaces about them—there is a source of pyorrhea, so-called. I do not agree with Dr. Price in his advocacy of saving so many teeth. If you place a denture in contact with loose teeth, food will annoy the patient. The denture that Dr. Gillett describes is so made that you have enough of the natural tooth left to support the artificial structure, the whole appliance giving promise of wearing well, with comfort to the patient, for many years.

Dr. Gillett (closing): I want to say to Dr. Price, that if it be necessary in order to conserve the welfare of the patient, I will cut off every sound tooth he has left. (Applause). The patient's welfare is paramount to all other considerations whatsoever.

I am not inclined to dogmatize, when it comes to distinctions between fixed and removable bridges. Nevertheless, in my opinion the extensive fixed bridge is doomed. (Applause.) The wide-awake men of the dental profession are refusing to insert them.

As has been emphasized by several who have taken part in this discussion, and as I stated to you in the beginning, I purposely adhered in the paper to the elaboration of the underlying principles inherent in this method of making restorations, keeping in the background the matter of detail. My parting injunction to you is, apply your minds in each case you undertake to the careful study of principles involved in that individual case before venturing to develop details.

Now, I want to refer back to Dr. Price's plea concerning the difficulties of performance in these cases, and his comparison between condition and remedy, and the same conditions as dealt with by the surgeon. What he said is correct, but is there not reason to suppose that this difficulty will disappear whenever we, as a profession, are equipped to speak convincingly to our patients as to the relation between ill-health and inefficiency and uncleanliness in the oral cavity?

Will not the medical profession and our clientele demand an effective solution of such problems at our hands?

Is there any reason to suppose that the dental hospital will not follow, in natural sequence, when the more expert members of our profession have demonstrated the results of restored efficiency in wrecked organs, and have shown that the difference between effective living and abortive effort is often dependent on mouth conditions?

When the public awakens to these possibilities, shall we not see the hospital, with its dental pathologist, busy in the investigation of dental disease; the diagnostician and the prosthodontist working hand in hand with the surgeon; the orthodontist and the specialist in oral prophylaxis; and its student-body eager to learn how effective results are obtained?

We are at the threshhold of our dental knowledge, and our profession has thus far but scratched the surface of its field.

The cutting of dentine is much less painful than scraping. Therefore burs and all other instruments should be of such design and quality and should be applied at such an angle that real cutting takes place. Too much stress cannot be laid upon this point.

NEWER PHASES IN CROWN AND BRIDGE WORK.*

BY F. E. ROACH, D.D.S., CHICAGO, ILL.

WE HEAR A GREAT DEAL of late about the mouth as a foci of infection for many diseases, and while a great many of these foci are to be found around fillings and inlays with poor contacts and rough gingival margins, pyorrhea pockets and alveolar abscesses, it is no doubt true that our crowns anl bridges are responsible for their share of the trouble.

There is no question in my mind but that we have abused this work in both faulty construction and injudicious selection of teeth to serve as abutments. We have also been guilty of exercising poor judgment in the selection of cases where crowns or fixed bridges should be employed at all.

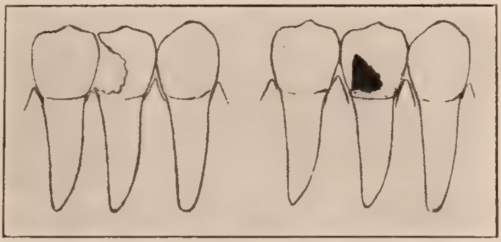

Fig. 1

We are confronted today by the charges made by Dr. Hunter and others that our crown and bridge work is jeopardizing the lives of many of our patients and while the extent of the actual danger is probably exaggerated, the preponderance of evidence at this time would indicate that the many pathologic conditions that do occur as the result of faulty obstruction, may be a foci of systemic infection. And if for no other reason than this we must put forth our very best efforts both in the selection of cases where crowns and fixed bridges shall be used and in their construction.

Plate 1, a, shows a very common condition of extensive decay and the usual loss of space between adjacent teeth. Before crowning such teeth the normal space should be restored if possible so that the proper interproximal space on each side of crown may be obtained. Plate 1, b, shows outline of crown for case after space is restored. The tooth should be built up with amalgam to facilitate fitting crown accurately at the gingiva.

Where it is impossible to restore space the tooth should be cut away freely mesially and distally, and the crown given a concave surface, and in this way secure at least some interproximal space. See Plate 2, b.

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*Read before the Northern Ohio Dental Society, 1913.

The loose pin porcelain crowns put out by the manufacturers, when properly fitted, may be employed very satisfactorily in some cases, and in view of the fact that they are so extensively used a simple means of obtaining accurate adaptation to end of root and peripheral continuity may not be amiss. With root cut down to outline of gum the crown is ground to approximately fit. The dowel is now fitted and secured to crown with gutta percha. A disk of gutta percha is placed over end of crown, warmed over flame and forced to place on root. By this means a sharp outline of root is obtained and the high places on root noted so that by repeatedly trimming off root with facer, stoning off excess of gutta percha, and at the same time grinding base of crown to outline of root in gutta percha a good fit may be had in a few minutes. Plate 3.

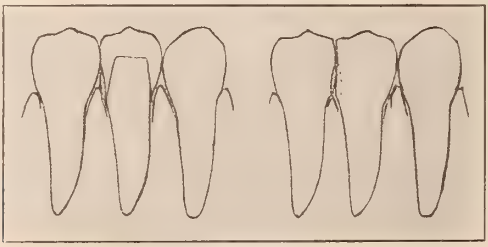

Fig. 2

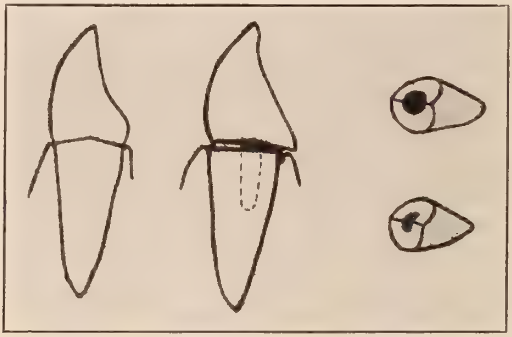

Fig. 3.

PORCELAIN-FACED DOWEL CROWN

While the porcelain-faced form of crown is seldom necessary, there are cases where it may be employed advantageously. The technic for this form of crown is as follows: Prepare root, fit band and dowel as for the usual construction, a, Fig. 4, grind and fit facing in the mouth. The dowel is now removed and hammered flat on projecting end until wider than distance between facing pins. With knife-edge stone file or plate punch make notches to correspond with pins. See Fig. 4, b. Facing and dowel in this relation are replaced in the mouth to verify the length of dowel, after which the dowel is threaded, heated and forced through a cone of inlay wax (c). Soften the cone of wax, adjust facing and dowel with wax cone and force them to place on the root, having band in place at the time. Chill the wax and remove all parts together by passing an instrument under the band and working off carefully from side to side so as not to disarrange the parts. Trim off excess, remove facing, put carbon points in pin holes, and you are ready to cast and finish in your favorite way.

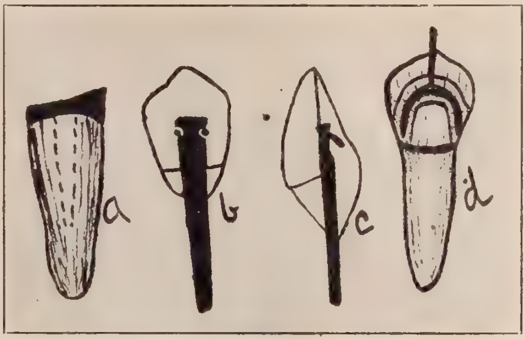

Fig. 4—Porcelain-faced crown with cast gold back. a, proximate view of root; b, shows means of maintaining relation of facing and dowel while fitting to root; c, facing, dowel and wax ready for adjustment to root; d, tooth preparation for lingual hood and iridio-platinum reinforcement wire fitted to groove.

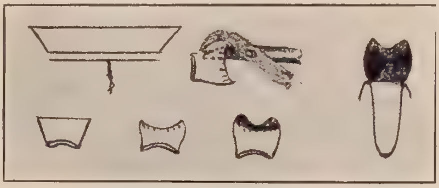

Fig. 5.

For this class of work there is no objection to the use of scrap and junk gold for the casting—preference is given iridio-platinum for dowel and 22- or 24k gold for band. The facing pins may be bent down at an angle about 45° or 50° in cases of close bite. Lingual Hood cast, d, Fig. 4.

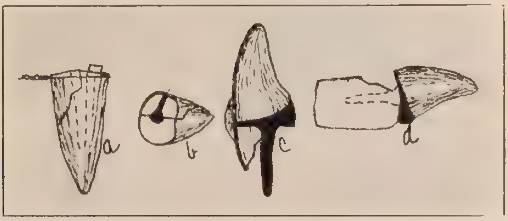

Fig. 6—Cast base crown fitted to split root. a, proximate view of root showing labial fracture held in apposition with wire; b, shows groove from orifice of canal to periphery of root across fractured portion; c, crown, dowel, wax and fractured piece of root assembled ready for making cement model; d, shows crown and wax base in position on model and piece of root removed ready for wax duplicate.

GOLD-CAST CUSP CROWN

There are a few that have adopted the cast cusp gold crown, but the technic of this crown is so little understood that its advantages over all other methods of construction are not appreciated. To my way of thinking, there is no other procedure that compares with it in any respect.

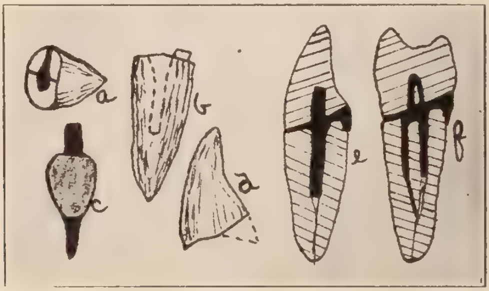

Fig. 7—Cast base crown. a, end view of root; b, proximate view showing lingual interlocking shoulder; c, dowel surrounded by cone of wax; d, porcelain crown showing how lingual extension is cut off; e, of cross section of completed crown.

The facility with which contour and occlusion may be produced is a marvel of simplicity and accuracy.

We frequently hear the claim that this crown requires too much gold to permit of its general use. This objection I am prepared to prove is not correct. The technic of this crown is simple, quick and accurate, and needs but a few words to explain.

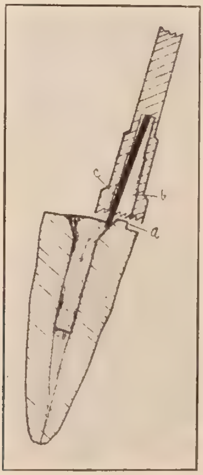

Fig. 8—Cross section of root and root facer. a, shows lingual interlocking shoulder; b, shows hole into head of facer; c, flexible guard pin. The flexible guard pin permits adjustment of the one-size facer to any size root without laceration of tissue.

With tooth properly prepared, the band is fitted in the usual manner and contoured with pliers. Band should be made long enough so that it may be cut and fitted to approximate the occlusion. A cone of inlay wax is now softened and placed over occlusal end of band and patient instructed to close upon it. Chill the wax, remove together with band, carve to anatomical form indicated, and with Suction Wax Carver remove any excess of wax from inside of crown. For this purpose I prefer the more transparent waxes so that the thickness may be more readily determined by holding up to the light while carving. Scrap and junk gold may be used for this class of work to better advantage than for any other purpose. In Plate 5 the steps are outlined.

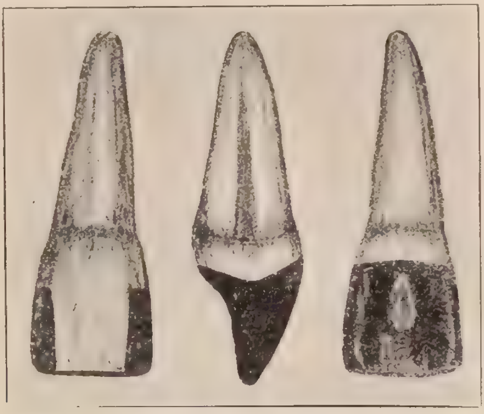

Fig. 9—Labial, proximate and lingual views of compound inlay and may be used for short bridge abutment or for pyorrhea splint—especially adapted to lower incisors where proximate fillings are necessary. a, Plate 10 shows end view.

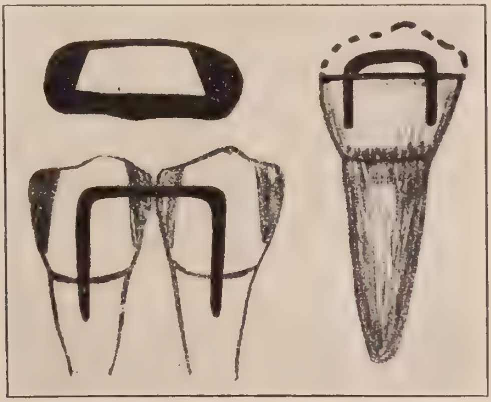

Fig. 10—a, shows iridio-platinum reinforcement connecting gold inlays in bridge and pyorrhea splint cases; b, shows wire staple anchorage for occlusal restoration.

SPLIT ROOT

While the casting process has completely revolutionized all my prosthetic and operative procedures in everyday routine work, it has at the same time enlarged the field of reparative measures, so that operations heretofore practically impossible of satisfactory accomplishment have become commonplace and simple, with results beyond our fondest hopes. As an illustration of this I am going to give you a description of a method of repairing split roots that has given me great satisfaction.

If our good friend Taggart had done nothing more than make possible the restoration to comfort and usefulness of teeth with split roots he would have rendered a great service to humanity. And while this operation is only one of many, it is unique in character and shows the possibilities of the process.

When a case presents itself with root fractured not more than one-half its length and the fractured piece is intact the repair is simple and positive. The procedure is as follows: Draw fractured part into close apposition by twisting wire around it, as in Fig 6, a. The steps outlined below for cast base crown are identical, so that when wax base is secured the piece of root is extracted and carefully placed in position on wax base—the groove across end of fractured piece and the side of canal affords a definite guide in locating it (b). The piece is now secured to the crown and wax base with wax (c). The fractured surface and dowel is coated with a vegetable oil and a batch of cement, mixed stiff, is pressed into apposition with fractured surface of root. When cement is hard it is scraped down flush with piece of root, after which it is separated from crown and piece of root. Piece of root is carefully separated from wax base and crown with base readjusted to its proper position on cement model, Fig. d, and inlay wax melted into space originally occupied by piece of root and scraped down flush with surface of cement model. This gives us an exact reproduction in wax of the piece of root, united as an integral part of the original wax base in its proper relative position, which is also true of the casting. When cementing such a crown to place in the mouth I prefer to use Evans' gutta percha cement on fractured surface.

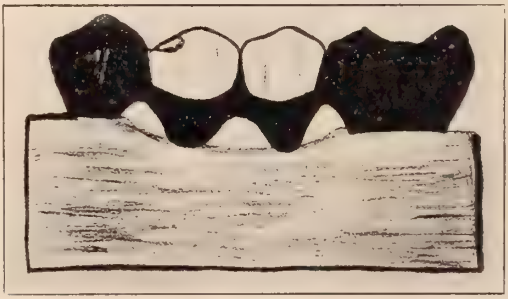

Fig. 11—Buccal view of lower bridge, showing interproximate spaces in casting. A, Plate 12, shows proximate view of dummy with preferred adaptation to alveolar ridge.

CAST BASE PORCELAIN CROWN

As I have discussed fully, in another paper, the shortcomings of the various crowns that are in general use today, suffice to say at this time in this connection, that the cast base crown, in my opinion, all things considered, stands at the head of the list for the ten anterior teeth.

The technic of this crown is as follows: Trim root to gum, enlarge canal for suitable dowel, enlarging or extending orifice of canal labially and lingually, Fig. 7, b, avoiding as much as possible weakening root by mesio-distal cutting. With the Universal facer the root is trimmed off labially below the gum by giving the facer a sweeping motion. The lingual interlocking step is now made by placing point of the flexible guard pin of facer into canal and forcing facer back until cutting edge is in line with lingual periphery of root; then, by holding it in one position, the lingual surface is cut down, leaving the inner portion, b, standing. A groove is cut from orifice of canal to labial surface, a, the object of which is the reinforcement of wax at this point while fitting. It also adds stability to crown when set. Select any loose pin crown suitable for the case, grind to approximately fit root and grind off linguo-gingival angle, as in Fig. 7, d. Fit dowel to canal, allowing it to project just enough so that it will reach bottom of hole in crown when labial end of same just touches end of root, thus determining exact length of dowel. Iridio-platinum wire 13-gauge threaded, is preferred, but clasp gold may be employed. The dowel is heated and forced through a cone of inlay wax, Fig. 7, c. Crown is placed over end of dowel, wax softened over flame while being held between fingers to prevent overheating, and when soft forced partly to place on root; remove, trim off excess wax. Repeat the above procedure until crown is fully seated, a perfect imprint of end of root is obtained in the wax, and excess of wax is trimmed to peripheral outline of both tooth and root, and sprue attached lingually. The crown is removed and the dowel with wax base pattern invested and cast, preferably in 24k gold, e and f.

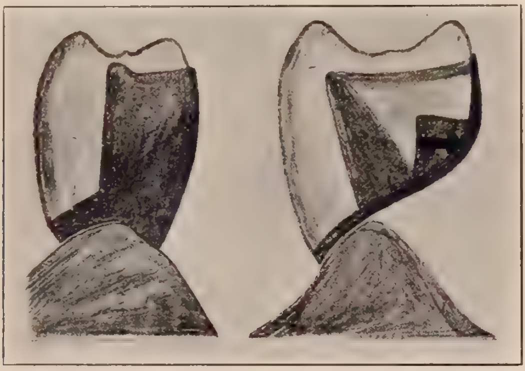

Fig. 12—Shows use of vulcanite tooth by cutting proximate grooves for retention.

In my experience with casting I have made the following observation:

That nearly all prosthetic castings should be made in combination with iridio-platinum or gold in wire or plate form as a means of reinforcement.

That iridio-platinum, on account of its great strength and freedom from oxidation, affords the best reinforcement.

That 24k gold reinforced with iridio-platinum is the best for inlay abutments.

That the reinforcement plan expedites as well as strengthens the work and obviates bulkiness, which is so essential in many instances.

That it is best not to heat any alloy of gold containing base metals to the point of oxidation when casting upon it.

That it is unnecesary and detrimental to heat a flask to a red heat or anywhere near it when burning out wax.

That the elastic limit of scrap or junk gold is practically nil and it should not be used where much strain will be brought to bear upon it.

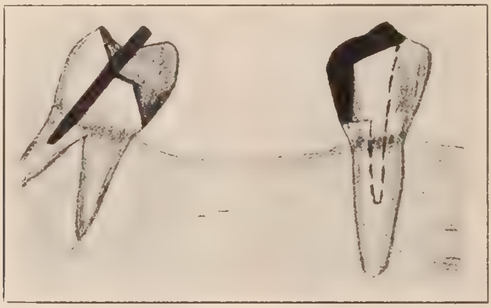

Fig. 13—Showing use of loose pin in a molar as a means of facilitating the settling of bridges where abutments are not parallel, especially inlay abutments.

That alloys of gold with platinum will become very brittle when cast a few times. This, Dr. Taggart tells us, is due to contamination with silica contained in the investment.

That the casting process makes possible the employment of almost all forms of porcelain teeth and that provision should be made for cementation rather than casting directly on to the porcelain.

That nearly all inlay abutments, regardless of size and shape of cavity, should have some form of supplemental pin anchorage.

ABSTRACT OF DISCUSSION.

Dr. L. L. Barber, Toledo, O.: Success in an operation of the delicate sort the essayist has described, is more a matter of care with which details are carried out than anything else. Dr. Roach speaks of taking his measurements of the root with a wire, after which he cuts his gold on an angle, like that, (drawing on blackboard), the large end being for the occlusal end of the crown.

Now, if you are not very careful the band will not fit the root at all. I know that Dr. Roach can do these things, but he should know that unless the point (I have illustrated) be impressed on the dentists some of them will go home and attempt the operation, and a poorly-fitting appliance will result. The details of such operations as Dr. Roach has described, should be impressed on us at least once a day for a longer or shorter time, until we have fully grasped the ideas and the technic. Dentists are not all mechanical geniuses.

We already have methods enough to admit of our accomplishing a great many things in a great deal better way than is usually attained. The trouble lies in the failure of the rank and file of the dental procession, in the matter of getting things down fine enough. Such a talk as this of Dr. Roach's calls out a rambling discussion, and from it all we get no clearly defined, accurate information after all as to what he meant to teach us. I think it is a mistake to have two such excellent papers as these last two read at a time when so little time is left after the readings for discussion.

Dr. Roach says to prepare the root in the usual way. I understand probably what he means, yet there are as many ''usual'' ways as there are dentists, and the ''usual'' way is not the right way. And to any man who has ideals and who studies and tries them, to look into the mouths of half the dental patients, and note the kind of dental services that have been performed for them is enough to make him sick. Such an amount of slip-shod work!

Now, I should like to have some more definite understanding of Dr. Roach's ''usual'' way to begin with.

Another point—in regard to waxing the cusps on your band in heating your band preparatory to casting gold on it, it will oxidize, and your union may not be good. To prevent that, you must cleanse the band thoroughly before waxing it, using boracic acid in solution with alcohol. Dip your band into the solution, burn off the alcohol, and your band will not oxidize. Your casting will go down very much better, and you will find you need not use solder as otherwise you might have to use.

About the cleansing space of saddle bridges: Dr. Roach speaks of making his saddle-teeth come down to a point, as I show here on the board. The under surface of the average saddle bridge is about as dirty a thing as you could think of. The forethought and care in doing these things is the great important point. Dentists do not plan out their work with enough care. They take too much for granted, and get away off the track in consequence.

I am sorry Dr. Roach did not take time to explain more in detail the placing on of the coping. Unless the band is fitted down very neatly and accurately, you are going to have a lot of irritation of the gum. Any obscurity as to the details Dr. Roach has omitted will lead the average dentist into trouble. I wish he could have given more time to several of these points.

Dr. E. E. Belford: I regret very much that Dr. Roach was not given more time for his talk for he has brought us many interesting and instructive processes and I think we would have profited more if he had continued his talk and the discussion had been omitted. I was particularly interested in the very ingenious method he has devised for repairing a split root and I think it could be followed to good advantage in practically every case of the kind presenting. I wish to thank him for coming here and for the benefit I have personally received.

Dr. Gillett: It would take my patients a long time to get such bridges as have been described, clean. If it be a lower bridge, why not make it so that the patient can sweep clear under it?

I remain unconvinced as to the merits of the fixed bridge. If Dr. Price will give me ocular proof that his patients wear such bridges, and he does not find, on removing them, accumulations of debris in the hidden parts, I will give it up.

Now, then, I want to speak of one other matter, and that is Dr. Roach's method of repairing a fractured root. Tomorrow, those of you who wish, may see at my clinic, restorations of molar roots, according to a method referred to in my paper—not the kind of restorations we all have made with amalgam, hoping they would be all right, secretly aware that they probably would not be all right. On later consideration I will reserve what I have to say until I can demonstrate with my models exactly what I mean.

Dr. Roach (closing): Regarding the use of gutta percha for fitting the crown—I am afraid I was misunderstood. I do not leave the gutta percha on there; it is used merely to determine when you have a fit. I did not intend to convey the impression that this was original with myself; had not been used by others. We are constantly reviving old things; the progress of invention is marked by the repetition of lots of familiar ideas. In order to invent systems and methods and processes, we have to refer back to the old and already used things.

Dr. Barber has spoken of the average dentist not being able to do what I have described. It is no such difficult matter to fit a band accurately. I always cut it a trifle, only a mere trifle short; that allows it to stretch, and it can be expanded somewhat to make it fit.

With regard to casting: I do not like that as well as bending a band with pliers. Only the cusps are cast. I believe I can make a crown more quickly, and comply with the conditions better.

As to the saddle—I have studied this form of replacement for many years. I have stood for removable bridges, and I believe such a bridge is the proper thing to use. The removable bridge, by all means! I have changed my mind as to the individual saddle-bridge; it is the cleanest thing you could put into the mouth. I have become convinced of this even against my own preconceptions and prejudice. Recently I had occasion to remove a lower bridge where two dummies were thus supplied, and found the saddles under the bridge absolutely polished and clean. A Chicago dentist made them.

Properly constructed, these saddles are all right. Before that I had been hearing that Goslee, Taggart and others were using saddles, yet I refused to be convinced. One most important point to be remembered: the saddle must not impinge too heavily upon the gum.

As to the sanitary bridge: the occlusal surfaces only of fixed bridges can be thoroughly cleansed. They are uncomfortable; patients complain that boluses of food accumulate under them, which are difficult to remove. I have got tired of hearing patients kick. They do not like fixed bridges, that is certain. An individual saddle-bridge is comfortable and cleanly. I thank you.

SOME HINTS FOR THE YOUNG DENTISTS.

BY LOOMIS P. HASKELL, CHICAGO, ILL.

Young men are constantly coming into practice, and in writing for their benefit I often repeat in later years what I have written in former years. So much for the repetition.

ARTICULATION OR OCCLUSION

There are more failures from faulty occlusion than from any other cause. There may be perfect fit, good adhesion, appearance all right, but when the jaw closes there is trouble. Too much pains cannot be taken when adjusting the teeth in the mouth to see that the occlusion is correct.

The anterior teeth must *never* come in contact, for two reasons: It causes displacement of the upper denture, sooner or later, and the pressure upon the anterior margin of the gums causes absorption of bone, leaving a flexible ridge so often seen.

The best way to secure correct occlusion of the posterior teeth is by use of the thick articulating paper, English make, placing a strip between the jaws upon each side and telling the patient to bite rapidly and hard, for then he will bite correctly, and it will at once be seen where the closure is too hard by the very black spot.

THE PROBLEM OF DENTAL CARIES*

BY EDWARD C. KIRK, Sc.D., D.D.S., PHILADELPHIA, PA.

AT NO TIME IN THE HISTORY of the dental profession has attention been focused so intently as it is at present upon the question of dental caries, its causation, its prevention and all that the disease itself means as a factor in the production of ill health and bodily inefficiency. Nor is the interest in this important subject confined to dental profession limitations as it is engaging the attention of physicians, educators, sanitarians, public health authorities, the Army and Navy Administrations, criminologists, political economists and the public at large. In short, it appears that *mens sana in corpore sano* is coming to be recognized as a condition dependent in no small degree upon *dens sana in corpore sano.*

Dentistry has from its beginning as an organized profession been preaching the gospel of the importance of sound teeth, an importance heretofore only partly appreciated even by those who have done the preaching, nevertheless the word sent forth has in due course borne fruit not only by attracting attention to the value of sound teeth but by calling forth a general inquiry as to the means of dental salvation. It is this inquiry expressed or implied that is the evident stimulus to the dental profession now urging it to seek out by the means of scientific research the truth about dental caries, its causation and its prevention, in order that the data necessary to an adequate answer to the inquiry may be available. At no time has our actual knowledge of the causation of dental caries seemed so inadequate, nor at any previous time has there been such manifest dissatisfaction with the available means at our command for combating the inroads and progress of this almost universal human disorder. Some poetically inclined individual has phrased this wholesome attitude of dissatisfaction with the existing order of things resulting from our ignorance of underlying conditions as a "divine discontent," a kind of dissatisfaction which is the psychic protoplast, so to speak, from which is generated the impulse that breaks the shackles of ignorance and impels us to seek out the truth which sets us free.

In an interesting paper entitled, "The Greater Problems," recently read before the Toronto Dental Society by Dr. Don. M. Gallie, of Chicago, the author, while generously according credit, even applause, to all the achievements which have characterized our progress in manual dexterity, in operative and prosthetic technic, the correction of inharmonies of occlusion, etc., very pointedly says, "Let us consider our success or failure in dealing with the most prevalent disease known to humanity and which today is our greatest problem, namely, caries of the teeth," and he very pointedly asks, "What are we doing today to prevent caries that has not been advocated and tried for centuries?" What indeed! we may ask, for the history of the subject as far back as recorded history runs registers the fact that the theory that "clean teeth will not decay" is coeval with the record, and that tooth-cleansing means and methods constituted then as now the sum total of dental prophylactic knowledge. It is related of the natives of certain islands in the Indian Ocean that there is a belief among them to the effect that the sun is a red-hot ball that causes the waters of the sea to boil with a sizzling noise when the sun drops into it at sunset, and that the noise could be readily heard if all the people of the island would remain perfectly quiet at the psychological moment of sunset, but as some one was always making a noise at that moment the sizzling sound of the setting sun has never been actually heard by any of them albeit the whole population steadfastly believes that the sizzle occurs diurnally with unbroken regularity.

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*Read before the Michigan State Dental Society, 1913.

Are we not in a somewhat analogous position regarding the soundness of our theory that clean teeth will not decay? Is it true that caries is essentially a filthy disease, and even if it be so, is it practically possible in view of what we now know of its causation to sterilize a denture and maintain its sterility by chemical, mechanical, or physical means so as to immunize it against the attacks of caries-producing organisms? Has all of the effort or any of it that has been practically expended in cleaning teeth from the misty ages of antiquity down to the present time effectively prevented the progress or reoccurence of caries? If it has, why do we now speak of caries as the universal human disorder? I do not wish to be interpreted as taking a pessimistic view of the problem of dental caries nor do I wish to be understood as claiming that the use of brush and dentifrices is without value as a sanitary and prophylactic measure. On the contrary, I merely wish to emphasize what I believe to be the fact that in order to effectively prevent caries we must seek further into its underlying causes, study the various factors that are necessary to the production of the disorder, the conditions that make possible and easy the development and activities of caries-producing organisms so that we may learn how to eliminate the conditions favorable and establish conditions unfavorable to the propagation of caries-producing organisms; in short, to convert conditions of susceptibility into conditions of immunity with respect to dental caries. That, I take it, is the essence of our problem and while I have perhaps stated the case in terms which, in respect to the background of our present knowledge of its relation to bacteriology, physiological chemistry and the physics and chemistry of nutrition, suggest a somewhat staggering complexity, yet in its essential features the statement is precisely the same problem as that which has confronted us from the beginning of dental history; for reduced to its lowest terms, what else is implied in the cleansing of teeth with brush and dentifrices than an attempt to change conditions of susceptibility to a condition of immunity? It is not the principle which is at fault but the means through which we have heretofore sought to apply it that are inadequate because the results so produced are but temporarily effective in changing the oral conditions.

In the caries-susceptible individual the conditions favorable to the disorder are continuously operative, whereas prophylaxis by physical or chemical methods of mouth sanitation are, in the nature of the case, intermittent and it does not require a mathematical demonstration to show what must be obvious on its face, that a continuous action cannot be neutralized by an intermittent reaction under otherwise equal conditions. The utmost that we can therefore hope to accomplish by physical and chemical methods in approaching our ideal expressed in the formula "clean teeth will not decay" is to diminish the rate and amount of decay by a partial approach to bacteriological cleanliness of the teeth.

What I have suggested as a "divine discontent" with our attempts to achieve an effective prophylaxis in relation to dental caries is making itself manifest among us in various ways. We have found out that some clean teeth do decay, i. e., teeth as clean as they can be made through the expenditure of an amount of time, effort and intelligence that will leave a working residue of these essential factors applicable to other life activities and, per contra, we have found out that some very unclean teeth do not decay. We also know that the tendency to decay varies among individuals and in the same individual at different periods of life quite independently of habits of oral cleanliness or otherwise. These considerations impel us to seek further for the underlying factors of the problem and as a result of our quest considerable interesting and suggestive matter in the nature of data bearing upon the problem has been brought to light.

The element of varying susceptibility among individuals and in the same individual at different life periods early attracted attention. The concurrence of opinion upon that point derived from a multitude of clinical observations upon the part of large numbers of practitioners leaves no room for reasonable doubt as to the correctness of the conclusion arrived at, so that the variability of susceptibility to caries of the teeth may be regarded as an accepted fact. In the attempt to explain this variation in susceptibility suspicion fell upon the equally well recognized variation in the textural difference clinically observed in the structure of the teeth themselves, and the conclusion was jumped at that "soft teeth" were more prone to decay than were "hard teeth" so-called. The researches of Black upon this phase of the problem have put a perpetual quietus upon that fallacy and enabled him to establish the truth of the axiom that "decay of the teeth is a factor of the environment of the teeth," which, from a bacteriological standpoint as well as upon *a priori* grounds, could also have been stated with equal justification We know then that caries of the teeth is not the result of soft teeth--nothing in tooth structure is a cause of decay though variations in density may modify the rate of progress of the disorder.

These scientific deductions from precise observation lead us then to a consideration of the environment of the denture as the arena in which the tragedy of dental caries is enacted. The researches of Miller established for all time our knowledge of the intimate nature of the carious process, its dependence upon the activities of specialized bacterial organisms having the property of splitting the monosaccharids into lactic acid, which acid is the principal decalcifying agent active in the first stage of the carious process. These lactic-acid-producing organisms find the conditions necessary to their life process in the mouth fluids of all caries-susceptible individuals; in the immune some of the conditions essential to their activity are assumed to be absent or lacking, a deduction apparently warranted by the fact that evidence of their activity in the production of caries in such individuals is absent.

That the causes of tooth decay are external to the tooth and not resident in the tooth structure itself is a theory which has been held from times of remote antiquity. We have records as early as the first decades of the sixteenth century of a belief in the fermentative origin of the acids that were assumed to play the principal role in the carious process. The obvious phenomena of fermentation were matters of common knowledge and that the decomposition of certain alimentary substances generated acid products was well known from very early times, hence in the older dental writings we frequently meet with the statement which I here quote from Oddo of Turin, who writing in 1856 says of the hard tooth structures: "The bony tissue is never diseased. Its destruction is due to the action of one or of several acids," and among the several sources of origin of the acids which act destructively the same writer notes the fermentation of the detritus of food substances which fermentation he states "is either putrid or acetic, certain aliments producing acids more active and concentrated than others." An earlier instance of the recognition of the part played by fermentation in the acid production in its relation to caries is recorded in *Arżney Buchlein,* a publication by an anonymous author in 1530. The researches of Miller in 1880 and thereafter, made clear the nature of this peculiar fermentative process in connection with the causation of caries, and determined its bacterial factor as well as the chemical nature of the end product of the fermentative process, as lactic acid. Miller, however, like all who preceded him, studied the etiology of caries from a standpoint of the fermentative process in relation to the decomposition of carbohydrate food debris, assuming that the source of fermentable carbohydrate necessary to the production of lactic acid through the agency of micro-organisms was derived wholly or mainly from the detritus of carbohydrate food-stuffs adherent to the teeth. Indeed, the convincing demonstration of the nature of the carious process, his reproduction of true caries artificially, was accomplished by infecting a starchy pabulum with caries-producing bateria and subjecting sound dentin to the action of the infected medium. While Miller's brilliant achievement gave us the true explantion of the intimate steps of the carious process from a physico-chemical point of view and established conclusively the nature and character of carious action, his results were inadequate as an explanation of certain of the phenomena of caries well established by clinical observation, and they failed especially to account for the well-known fact of susceptibility and immunity to the disease. This latter fact he himself clearly recognized, and it was with the problem of susceptibility and immunity that he was particularly concerned when he was prematurely called to the Great Unknown.

The clinically-observed fact that caries is not essentially a filth disease, that some clean teeth do decay while some unclean teeth do not decay, and the other fact of the variability in susceptibility to decay in different individuals and at different times in the same individual, are phenomena which are not explained nor are they explainable upon the theory that caries is caused by acids generated by the fermentation of the debris of carbohydrate food-stuffs taken into the mouth for purposes of alimentation. Some other factor or factors evidently enter into the etiology of the carious process which as yet have not been satisfactorily accounted for. And again we are driven to the study of the tooth environment for an explanation. In a series of papers published between 1890 and 1900 and notably in a paper presented to the Third International Congress in Paris in 1900, Dr. Joseph Porter Michaels strongly directed attention to the importance of a study of the chemical composition of the saliva in its relation to general systemic states, and emphasized his conclusion derived from a long and careful study of the subject, that the saliva in its varying composition furnished a reliable index to the bodily nutritional state at any given period.

Among other substances which his methods of analysis have enabled him to detect in the composition of the mixed saliva, was a fermentable carbohydrate substance answering to the tests for glycogen. My interest in the work of Michaels led me to make several trips to Paris for the purpose of study in his laboratory under his direction, and among other lines of studying, the significance of glycogen as a part of the salivary composition in connection with susceptibility to caries, has occupied my available time for several years. My observations on the subject both from the standpoint of laboratory experiment and from clinical observation led me to the concluion that the saliva of the caries-susceptible is characterized by the presence of this fermentable carbohydrate. which Michaels has denominated glycogen, and that its absence from the salivary composition is characteristic of the saliva of the caries-immune. This conclusion is in harmony with the findings of Miller that the incubation of a caries-susceptible saliva generates a higher percentage of acidity than the saliva of a caries-immune. If then we find that the carbohydrate pabulum necessary to the activities of the caries-producing micro-organism occurs in soluble form in the salivary composition of the caries-susceptible and is not mainly derived directly from the debris of carbohydrate food-stuffs adherent to the teeth, we have to deal not with a factor of local sanitation so much as we have to deal with a question of constitutional susceptibility in the problem of prophylaxis of dental caries. It is my conviction that the more we study the question from the point of view of its constitutional relations, the nearer we will come to a rational understanding of our problem as all of the evidence tends to fit into that view of the case

If glycogen is present in the saliva it is due to its presence in excess in the blood plasma, and its production in excess in any instance is a result of nutritional activity mainly dependent upon food habit. It would overburden this paper and likewise overtax your patience were I to trace out in detail the steps of glycogen formation and to account for its presence in the salivary fluids. It is, however, important for us to note that excessive glycogen formation is a result of overfeeding on carbohydrate food, and it is just that fact that has caused some confusion in our minds as to the observed relation which the excessive use of carbohydrate food-stuffs bears to the causation of caries. As I have already stated and as you all well know, the fermentation of carbohydrate food-stuffs has for centuries been looked upon as one of the causes of caries. Miller's researches demonstrated that fermenting food debris could be a cause of caries. Our logical deduction has therefore been "keep the teeth free from carbohydrate food debris and they will not decay." But, as I have shown, there are instances where, keep the teeth as clean as you can, they will still decay, and the reason I believe is to be found in the fact that the necessary carbohydrate factor in the carious process is naturally a part of the salivary composition of the individuals who constitute the class denominated caries-susceptibles It is not the direct fermentation of carbohydrate food debris adherent to the tooth surfaces but the fermentation of the metabolized carbohydrate shed out in soluble form from the blood plasma through the salivary glands, that is in my opinion the pabulum of caries-producing organisms, and it is this abnormal metabolic activity which constitutes the constitutional predisposition toward caries susceptibility.

The localization of carious action through the agency of the bacterial plaque is now sufficiently explained and need only be referred to here as a necessary factor in the process of tooth decay.

What I have mainly endeavored to set before you is my belief that dental caries is the local expression of a constitutional predisposition dependent upon an abnormality in the nutritional processes of the susceptible class of individuals; that this predisposition is mainly a result of food habit and therefore that its true prophylaxis is a dietetic problem to be solved by careful and thorough study of the effects of diet upon salivary composition and the effects of salivary composition upon the progress of caries.

In a paper by Dr. Piercy B. McCullough, Director of the Dental Dispensary of the Philadelphia Bureau of Health, on Dental Prophylaxis, he says, "Dental caries is caused by the solvent action of lactic acid fermentation. Susceptibility and immunity is as the oral fluids are favorable or unfavorable media for the acid-producing bacteria. The saliva is a product of nutrition, so that the lack of balance in a carbohydrate and proteid diet is fundamentally a cause. It therefore will be seen that we are called upon to combat a disease which for sociologic and physiologic reasons is not preventable.'' Personally I am not inclined to take such a pessimistic view of the situation. The progress made in sanitary science, in personal hygiene, in all that appertains to individual and communal health matters, is almost revolutionary in its activity and the interest in these questions is practically universal. If further scientific research should determine that dental caries and its sequelae and the burden of ill health, bodily and mental deficiency which they entail could be eliminated by a rational dietetic system, it can hardly be doubted that the irrational course we are now generally pursuing of following the dictates of our disordered palates rather than the indications of sound reason and good sense in supplying our bodies with the proper kind and amount of wholesome food would become one of the characteristic marks of human progress that would more than anything else justify our claim to be an enlightened and civilized part of the human race.

DISCUSSION.

Dr. Don M. Graham, Detroit: I am sure that we are to be congratulated on having so eminent an essayist with us tonight to discuss the important subject of dental caries. Scientific investigation must necessarily be done by the few, as few indeed are by nature and by training fitted for research work. With little trouble, a program committee can convene a striking array of clinical talent, but it is with the greatest difficulty that a single scientific essayist can be secured for a state meeting and for this reason we are most fortunate in having Dr. Kirk with us tonight.

I am not a scientist and therefore am not in a position to discuss profitably this paper. All I can do is to thank the essayist for his very able presentation of the subject, and touch slightly along the clinical phases of dental caries. The solution of this question belongs to the dental profession and it can not be settled by any single man, it would appear, since little advance has been made in this direction in the last two or three decades, and I have been more than pleased to learn that the National Dental Association has organized a research department by means of which we may each contribute some little part to the solution of a question that is as old as civilization and one that bids fair to be with us for a good many years. Little has been added to what has been given to the profession by Dr. Miller. Yet the earnestness which has been shown toward the solution of this great problem, bespeaks, in my opinion, some early advances, if not a cure in the field of dental caries. Time and again our hopes have been dashed. A few years ago the profession became quite sanguine over the possibilities of potassium sulphocyanate being the inhibitory factor in dental caries and forthwith we began administering this drug to our susceptible patients until our friend, Dr. Bunting, discouraged our efforts, stating that the use of tobacco would have the same effect.

Again our hopes ran high when our prophylactic enthusiasts announced their slogan, ''A clean tooth never decays.'' In the hands of the specialist in this line, much good undoubtedly accrues from such treatment but I think the most of us are convinced that the public generally fall very far short of being protected from caries by this treatment. To my mind the statement that ''A clean tooth never decays,'' is about as comforting and consoling to the average citizen as the statement, ''Boiling water never freezes,'' can possibly be to the Greenlander. The ability of keeping the teeth absolutely clean is not less impossible than would be the task of the Greenlander in keeping all the water in his frigid home from freezing.

There is no attempt at minimizing the good that systematic and frequent prophylactic treatments can be to our patients, but it would appear that if many of us are to be consistent, this form of treatment would be brought within reach of the majority of patients by employing a non-professional worker. I have, of course, the employment of a "dental nurse" in mind, whose services could be given at a minimum price and whose work to be sure would be confined strictly to "cleaning teeth." Pyorrheal treatments come within the domain of surgery and for this reason could not be included in the work of the non-professional assistant, as I believe the skill demanded in the reclamation of pyorrheal teeth is quite as exacting and certainly as important as any other phase of dental surgery.

Recently I have been interested in a book by Pickerell whose conclusions are at variance with the generally accepted beliefs regarding prevention of decay. We have believed that alkaline mouth washes and dentifrices were the scientifically correct thing to use, but this author seems to have proven to his own satisfaction that the acid dentifrice and mouth wash is the scientifically correct thing to employ. It seems unkind to make our manufacturers change those nicely-worded and roundly-finished sentences extolling the alkaline mouth preparations to ones which now must laud the acid element in these articles. But the fact is it will require a few years to prove or disprove this new theory.

Mechanically we have made some advances against dental caries. Indeed, mechanically the mouth preparations have their greatest value as it has been conclusively proven that no drug or combination of drugs has a monopoly of virtues in the sterilization of the mouth and that their efficiency depends greatly on the mechanical application of these preparations. We must all subscribe to the "extension for prevention" idea, whether we use a filling or an inlay. Indeed, the ability of the inlaid tooth to resist caries is, in my opinion, due to two things First, the necessary extension for its proper insertion and secondly, the cement material which hermetically seals the dentinal tubuli. For this latter reason I believe that all cavities should have an intermediary cement lining. Other mechanical and therapeutic helps might be suggested but I shall close by saying that a liberal application of silver nitrate to inconspicuous and concealed places is a great aid toward preventing caries in posterior teeth, especially in children.

Not having the privilege of seeing Dr. Kirk's paper before its reading tonight, I am unable to do the paper the justice it deserves, and beg leave to be excused from its further discussion.

Dr. G. C. Bowles, Detroit: It is a curious spectacle we witness in this effort of the dental profession to cut off the limb which supports it. The Committee of Scientific Research of the National Dental Association is planning to raise from the members of the profession $40,000 a year for five years with which to hire experts in an endeavor to solve the problem of immunity to dental caries. And they will get the money. Every man in this audience will count it a privilege to contribute his share and so will every live man in the profession. Zealous individuals have worked on this problem and evolved many theories, and committees have consumed vast quantities of midnight oil in the search for the elusive panacea for dental caries. All over the land and beyond the seas, the gospel of oral hygiene is being preached and the poor best that we know for prevention, we freely give to the public. But we have a long way to saw before the limb is endangered. Perhaps this is why we are so zealous. The best we can do at present is to proclaim that a clean tooth never decays, a statement true enough for general consumption but one that in no wise endangers our calling. It is impossible for the susceptible public of itself to maintain its teeth in that degree of cleanliness necessary to render them immune to decay. Indeed, I fear that the ten per cent. of the public which now receive dental care could not be rendered immune if the whole dental profession beame prophylaxis specialists. For as the essayist of the evening has repeatedly pointed out, immunity is not conditioned upon artificial cleanliness, but upon natural conditions not yet understood.

Last month a young lawyer called on me for an examination. I found his teeth fairly clean and absolutely free from caries, fillings or tartar deposits. He had called on me a year before with the same result. I questioned him as to his antecedents and habits. They were negative. His father had poor teeth, having lost many from loosening; his mother had good teeth as far as he knew. He had the worries of a young lawyer in a strange city, awaiting practice. "He ate any old thing at any old time at the most convenient restaurant," as he expressed it, and he cleaned his teeth once a day when he thought of it, but he thought of it only once in a while. He is in perfect health and never has an ache or pain. What caused his immunity to caries? Is it his perfect health? Others seem as well who are highly susceptible. Are we likely to find any short cut whereby we can put the suceptible into his class? I hope so and that soon, but "I hae me doots."

Since the days when some of us thought the problem was so simple as to be solved by a KCNS table we have learned that it increases in complexity the deeper we go. When the truth is known it may be that we may control or neutralize the activities of the lactic acid bacillus by means of a bacterial vaccine, by internal medication or we may find it necessary to start with the grandparents, change their mode of living and control their whole process of metabolism.

At the present time the only efficient means for stemming the rising tide of dental caries for the masses, constitutional prophylaxis being out of the question, is mechanical cleanliness brought about by the tooth brush and its adjuncts and also by the more thorough mastication of food stuff. And both of these means are hard of enforcement upon children either young or old. I say mechanical cleanliness for I believe that any attempts to inhibit decay by means of antiseptics employed in powders, pastes or mouth washes is worse than useless. Any antiseptic with power to penetrate the mucoid deposits and destroy the bacteria lodged in the pits, interstices and approximal spaces of the teeth, in the short time such an agent remains undiluted in the mouth, must injure, if it does not destroy, the cellular elements of the tissues, and seriously interfere with their natural forces of defense.

And suppose that we grant, for the sake of argument, "that the powerful, non-poisonous, antiseptic deodorant and prophylactic" agents so persistently and skillfully forced upon our attention, actually destroyed the flora of the mouth, how long would it be before normal bacterial activity were resumed? To produce immunity by such means would necessitate keeping the mouth under the influence of these "powerful non-poisonous" remedies twenty-four hours a day.

If I am right in this contention then the use of those eloquently advertised mouth lotions actually does harm. If not directly to the tissues of the mouth then indirectly by lulling the patient into a sense of security where there is no security and leading him to depend on a half minute's rinsing with some mouth wash when a ten minutes' vigorous use of the tooth brush and dental floss and the complete removal of all food debris is what is required.

If this be true, we as a profession, are aiders and abettors of this deception, and are doing more to induce tooth decay than we are likely to undo with all our scientific investigations, in many a long day to come. It is time this phase of the matter received the attention of competent investigators and an authoritative statement issued.

We are constantly called upon to recommend mouth washes and dentifrices. Our advice should be based upon definite knowledge and not upon the interested and contradictory statements of manufacturers who depend upon us to boost their wares.

Apparently, however, all the information many of us have on the subject is derived from this source, for it is all too true that as a profession we are not buyers and readers of professional books or magazines. And even if we were all careful students of current dental literature, we would be, perhaps, on this particular matter, no better off. Perhaps it is just as well to know less than to know so much that isn't so, for much that passes for information is mis-information. Nothing is yet settled. The day of scientific thinking and investigation in dentistry is just dawning and some of those who essay the role of scientist are technically and mentally unprepared for the task. And yet, what is more interesting than to keep in touch with the striving, to learn to sift the wheat from the chaff, and to observe order emerging from chaos. And interesting or not, we must do it or suffer the fate of the quiescent mummy who, gazing with sightless eyes into the midst of 20th-century thought and progress, has no part in it and wots it not.

As Dr. Bunting stated yesterday, never before has so much earnest thought been given to the problem of dental caries as at the present time. One of these earnest thinkers, Dr. Percy R. Howe, makes an interesting contribution to the subject in the January, 1913, *Cosmos.* He has determined by experiment that many medicinal substances such as iodin tincture, the iodids of sodium, potassium, mercury, the bromides of sodium and potassium, and others of that class taken in gelatin capsules so as not to contaminate the saliva, entered the blood stream and appeared in the saliva in about twenty minutes and at the expiration of nine hours was still present. Iron preparations, whether ferric ferrous or carbonate behaved in the same manner. The author concludes that it is not contact with the teeth during the act of swallowing, but the fact that the iron preparations are soon secreted back into the mouth that accounts for their destructive action. This is important, if true, and suggests that if agents injurious to the teeth may so behave, why may not agents beneficial be found to behave likewise?

On the other hand Dr. Pickerell asserts that acids induce a flow of alkaline saliva and recommends the flavoring of foods with organic acids for this purpose. Dr. Pickerell also divides teeth into two classes, hard and soft, and says the texture of the tooth determines resistance to caries. Dr. Kirk says Dr. Black's experiments put a ''perpetual quietus'' on the hard or soft tooth theory, though, if I remember correctly, Dr. Kirk says there may be a ''variation in density'' which may affect the carious process.

Do not the pits resulting from imperfect union of the calcification centers affect the hardness or softness of a tooth and its susceptibility to caries?

Dr. Kirk says the oral secretions of immunes lack the conditions essential to bacterial activity. By inference this may be made to accord with the teaching of Black who finds the baccili of caries equally present in the mouths of immunes and susceptibles, but that their acid products are neutralized, diluted, washed away or otherwise rendered inert. I would like to ask Dr. Kirk if this is his belief also.

On first thought it might appear that the glycogen or soluble carbo-hydrate theory of Dr. Kirk would render our efforts at mechanical prophylaxis worthless. For what is the use of removing food debris from and about the teeth if the saliva is constantly pouring forth a pabulum even more conducive to bacterial activity? But before this soluble carbo-hydrate can be rendered harmful it must be attached to the tooth and protected from interference long enough for the fermentative action to take place. I should like to ask Dr. Kirk, or Dr. Bunting, or any one else, if it has been determined how long it takes to begin the actual fermentation in the mouth.

Dr. Kirk expresses the faith that when science has shown that right living will insure good physical and mental health, men will live right. This is an exhibition of a faith that removes mountains. If science can give us a pill or an injection and permit us to indulge our appetites, well. But if health is only to be obtained at the expense of our appetite then are we of all creatures, most miserable. For twenty centuries the Christian church has offered two routes to salvation: faith and works. Faith has ever been the popular route. We will believe anything you ask, but don't ask us to do, or deny ourselves anything.

DR. R. W. BUNTING, Ann Arbor: This has indeed been an interesting paper and also the discussion which has followed it and to no one has the interest been as great as to myself, by reason of the fact that I have been thinking along those lines for some time. It is a matter of the greatest regret to me that I have not been able to prepare a discussion which is fitting for such a paper and one with which I myself would feel satisfied.

There have been a number of reasons for my not having done this, the chief of which has been Dr. Kirk himself. For, when I asked that I might be excused to go to my room and think of some things I would like to say he objected by saying. ''Don't do it, Bunting, I expect you will talk yourself black in the face anyway.'' Now I can't do it, because, as a small boy would say, ''I am up in the air.'' I have said that the more I have studied dental caries and the saliva the more I thought that nobody knew anything about it. The deeper I went into the subject and the factors which enter into the question, the more I am convinced that our present knowledge is very meager indeed. For that reason I cannot discuss this paper as intelligently as I would like to do.

Gentlemen, this is a question that is a challenge to our profession. The laity and the medical profession look to us for the solution of this problem, and they are now, and have been, criticizing us severely because we have not solved it. But this criticism is not fair when we consider the investigation that has been done in the past and that is being done today. Everyone must admit that every known form of research has been applied to this question, but to no avail. Although we have not been able to solve the problem we have worked on it and we have no need to be ashamed of our efforts.

But what has been accomplished? We have before us a large mass of facts which we have acquired by research. One man in one section of the country works on one particular phase of the question and another man in another section on another part. The results may agree or disagree.

Gentlemen, tonight you have had the pleasure, as I have had, of listening to a paper which has done for us a good many things. It has done for us what Dr. Kirk has done for the scientific work in a good many other lines. In the past Dr. Kirk has taken the work of other men who have investigated other lines of dental research and have been unable to interpret their results; he has picked the good from the bad and has delivered it to the profession in such a way that the profession can make use of it. Now, tonight he has done that same service with our knowledge of dental caries. I, for one, wish to express to him my sincere appreciation because it means a great deal to me. I have been trying to have a talk with Dr. Kirk regarding these problems for over a year because I have been puzzled and I wanted to know how he felt about some features of investigation and tonight we have heard his opinion.

Now, as we have seen tonight, the bulk of the work that is being done in the control of caries is directed toward the saliva and there is the place where our investigations are the weakest. We must know more of the effect of the diet upon the saliva. As yet, we have done very little investigation of the diet. In other lines of research a great deal of attention is being given to the diet. Last winter we had that work which was given by Dr. Black, in which he demonstrated that the tartar was dependent on the kind and amount of food ingested. Although his theory is not established, it is a statement well worth considering. We have men who tell us that if we want to get fat, we must diet; if we want to get lean we must diet; if we want to have health, we must diet; and they are continually thinking of the factor of diet as a matter of general health. This is an awakening of our series of investigations along these lines that may lead us to something. The time may come when someone may show us how we may live and what things we must eat that will allow us to live properly. There is no question but that the large majority of us, too many of us, are *not* eating to live. Some of us seem to be living to eat. And these are the factors which Dr. Kirk has put before us and I have every reason to feel that here is a great field for research and there is no man who is better able to guide and direct a research of this kind than the essayist, because he has spent a great deal of time on this question.

But just as Dr. Bowles said a minute ago, if we find that the solution of this problem is in the diet, we may never expect that it will eliminate operative dentistry. Even if Dr. Kirk could work out a series by which a man could regulate his diet so that he could eliminate from his saliva those factors which are able to produce caries, he could get only about one person out of a hundred to follow that system. But now, what does it mean in the profession? Dr. Kirk told us in the beginning he was going to give us a dose of castor oil like our mothers used to give. I will not agree with him because it is not the kind our mothers used to give to us, but it was fixed some way so that it was palatable and we all liked to take it.

This paper is interesting to the man who is looking on from the outside and also to every man who is engaged in the study of these problems and has an opportunity to spent a good deal of time on it. I think that every one of us should take this paper when it is published and sit down quietly and read it through and find out what is there. It is interesting to every man and it will give him the best information up to date of the investigations which have been made on dental caries, a question which is most vitally interesting to every practitioner of dentistry.

DR. KIRK (closing): I wish to express my sincere appreciation of the sympathetic attention which the audience has given to the presentation of the intricate subject of my paper and I wish particularly to thank the gentlemen who participated in the discussion of it for the clear and intelligent grasp that they have shown of the subject matter of the paper, and particularly for the critical analysis of the principal features of the paper as offered by Dr. Bowles.

The main point which I have endeavored to emphasize in my discussion of the caries problem is what I believe to be a fact, namely, that while the researches of Miller proved conclusively that dental caries can be produced, indeed is produced, by the lactic fermentation of carbohydrate in food debris in the mouth, there are other factors involved which indicate that there is a constitutional element involved in the process of caries, that it is not wholly a local disorder in its origins. The self-evident fact of variability in susceptibility to caries is, if not proof, at least strong indication of the constitutional relationship of the disease. The obscurities of the problem are manifestly great, nevertheless, I do not think that the obstacles which these obscurities impose should deter us in making the attempt at its solution, nor do I regard the possibility of its solution as being at all hopeless provided that we persistently investigate and intelligently study the subject in all of its manifold aspects.

Answering Dr. Bowles' question as to the relationships of variation in tooth structure to carious process, I regard the finding of Black in that matter as being conclusive, viz: that caries of the teeth is a factor of the environment of the teeth, and that therefore dense teeth will decay in a carious environment and frail teeth will not decay in a non-carious environment. The only modifying effect which I can conceive of resulting from variation in density of tooth structure is that stated by Black himself, namely: that these variations in density may alter the rate of progress in decay, but cannot act as factors in originating decay. The observations of Dr. Pickerill referred to by Dr. Bowles, that organic acids induce a flow of alkaline saliva, is interesting in itself, but I see no reason to deduce from that observation the conclusion that the flow of alkaline saliva will neutralize the acidity of the organic acids which have induced it, for the reason that alkalinity of the saliva, as I have studied that question is due not to free alkalies but to the presence in the saliva of the basic sodium and calcium phosphates, which cannot in the nature of the case neutralize free acids. If this alkaline saliva exerts a protective influence against the action of free acids taken into the mouth, it cannot be through the neutralizing effect of the basic salts which give alkalinity to the saliva, but is probably due to the fact that alkaline saliva holds mucin in solution which is precipitated by the action of the acid; in that way the saliva is cleared of its acid content.

Answering Dr. Bowles' other question, it is certainly true that, in order to produce the disorder which we know as dental caries in its characteristic expression, it is necessary that there must be some means for the localization of the bacterial activity by fixation of the bacteria upon a definite point of the tooth surface. This localization is accomplished in two ways: first, by surface defects or irregularities of the enamel, or in protected conditions created by the tooth form itself; secondly, by the agency of the bacterial plaque which, by the way, I believe to be of mucinous origin.

I do not wish to overburden you with a discussion of the discussion, and therefore will simply repeat my thanks for your kind consideration of my paper.

INLAY ATTACHMENTS FOR ONE-TOOTH BRIDGE.*

BY W. L. GARES, COLUMBUS, OHIO

Grind the crown of the tooth slightly concave, just enough to clear the opposing tooth. Drill four holes in crown with about No. 559 fissure bur to avoid undercuts, making the holes about sixteenth of an inch deep and as far apart as the tooth will allow.

Cut cavity in wall facing the bridge, extending it over into the crown and as near the gum line as your faith in extension for prevention warrants; cut a defined but shallow cavity with parallel walls. Take impressions of cavity, using force enough to get good impression of holes made in crown; cast and return inlay to cavity for all necessary finishing before taking plaster impression.

The method is recommended principally for a one-tooth bridge to avoid devitalizing or crowning two perfect teeth for attachments.

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*Clinic Ohio State Dental Society.

The host of people who have seen and marvelled at the wonderful new ''talking pictures'' will be deeply interested in an article on this subject in a recent issue of *Lippincott's*. ''Much of the intricate mechanical phase of the new invention is a secret, but it may be stated here that the phonograph which is placed behind the screen is wired to the picture machine, which may be one hundred or more yards away. The speed of the talking or singing acts as a brake on the film, so that neither can get ahead of the other.

''After years of patient research, Mr. Edison has developed a recorder of sufficient delicacy to catch the minutest sound-waves at a distance of forty or fifty feet, in order that the recording apparatus would be outside of the field of the lens. It is this device that presents mechanical contrivances too intricate to describe, but its effectiveness lies in the ease with which the operator may attach it to the picture machine, and it is left to the actors and the singers to perform in the regular way to make an infallible dual record.

''The talking machine is so constructed that it sets the pace for the picture machine, so that the reel cannot overrun the record on the phonograph. The operator, who is compelled by the new law to operate in a booth that is fire-proof, and consequently sound-proof, is provided with a transmitter from the phonograph, and a speed indicator by which he can detect any trouble behind the curtain.

''To what vast scope the Kinetograph may attain, one may not easily predict at this time, but it is certain that entertaining the people is not the limit of its possibilities.''

THE DIFFERENTIAL DIAGNOSIS AND TREATMENT OF CERTAIN DISEASES OF THE SOFT TISSUES OF THE MOUTH.*

BY J. P. BUCKLEY, PH.G., D.D.S., CHICAGO, ILLINOIS.

IN DISCUSSING THE DIFFERENTIAL DIAGNOSIS and treatment of certain diseases of the soft tissues of the mouth, as I have been requested to do by your program committee, I shall confine myself largely in this paper to such diseases as are not directly associated with the teeth; and with which the dentist should be thoroughly familiar. Our profession has been criticised in the past, and perhaps in a measure justly so, because it is claimed that in our examinations of the mouth we have been looking only for cavities in the teeth and have not noted, at the same time, the condition of the oral mucous membrane and soft tissues. The tendency is to broaden our perspective, and the live dentist of today realizes the importance of a knowledge of the pathology of the soft tissues of the mouth as well as of the teeth themselves. I feel that this is evidenced by the fact that among the many invitations which I have received this past summer from different dental societies, three have requested a paper along this line; and I desire here to congratulate your program committee on their progressiveness. Our profession has expected large things of Cleveland, and we have never been disappointed.

The mouth is an incubator for many kinds of bacteria, as will be shown later, and is therefore a fruitful field for diseases of almost every description. Some of these diseases are purely local, having certain definite causes, while others are local manifestations of some general disorder. Even those diseases that are caused by local infections are influenced in most instances by the condition of the stomach or general metabolism of the individual. The mouth and the stomach are intimately connected and closely related; so much so in fact that pathologic conditions in the one often predispose to disease in the other. We can more readily understand the close relation that exists between diseases of these two organs when we remember that much of the septic material of the mouth ultimately finds its way to the stomach and intestines, and the toxins absorbed from the digestive tract are frequently excreted in the saliva. Michaels claimed the saliva to be pathognomonic of certain systemic diseases, the diagnosis being made by him solely by physical and chemical examinations of the saliva.

Some of the diseases of the mouth are characteristic and easily differentiated and diagnosed; while the correct interpretation of the clinical manifestations of others is exceedingly difficult and often-times baffle the most skillful diagnostician. In our larger cities we are fortunate in having the pathological laboratories which must frequently be used in order to confirm our clinical diagnosis.

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*Read before the Cleveland Dental Society, 1913.

SYPHILIS

I shall first direct your attention to the discussion of syphilis, a chronic infectious disease now known to be produced by a specific microorganism, the spirochaete pallida—a germ discovered March 3, 1905, by Schaudinn and Hoffmann. Syphilis is a much more common disease than is generally supposed, and it is essential that every practicing dentist be familiar with its characteristic symptoms. Skill in the diagnosis of syphilitic manifestations is of the utmost importance, not only for the protection of the dentist himself, but for the protection of his patients as well. It matters not whether the dentist ever expects to treat a case of syphilis, the menace of the presence of this disease can only be avoided by the careful and intelligent reading of the clinical symptoms.

Acquired extragenital syphilis is primarily manifested in and about the soft tissues of the mouth in what is known as the initial lesion or *hard chancre,* which, as a rule, develops in from three to six weeks after infection. The chancre may occur in various locations on the lips, tips of the tongue, and the pharynx—and is characteristic of what is recognized as *primary symptoms.* The infection here is produced by direct contact of the spirochaete pallida with an abraded surface. The principal means of conveying the infection extragenitally is through the act of kissing, using the common drinking cup, and other utensils or instruments which have been contaminated with the germ.

In the locations found in the mouth, chancre is usually single, though it may be multiple. It may appear first as a papule, the superficial cells of which finally ulcerate, with necrosis of the central area quickly following, when a copious and *highly infectious* discharge comes from the crater-like opening that is forming on the tissues involved. The ulcerations occur in from four to ten days after full development of the chancre, until which time the patient, as a rule, experiences very little pain or discomfort.

The treatment of the primary symptoms of syphilis, until recent years, was considered unimportant. In fact, unless a positive diagnosis could be made, and it is still often difficult to be certain of the diagnosis at this stage of the disease, it was suggested that the treatment be deferred until the diagnosis is established by the manifestations of the secondary symptoms. But thanks to the chemical laboratories of the world and the synthetic products there produced, all this has now been changed. Ehrlich, the discoverer of salvarsan, or "606," as it is commonly called—the new specific for syphilis—says, "too much weight cannot be laid upon the importance of diagnosing a syphilitic sore as soon as possible. We should certainly not wait for secondaries to develop or until the Wassermann reaction has become positive. In no period of syphilis is salvarsan more strongly indicated than when the chancre is the sole symptom, since with a single injection the chances are no further manifestations of the disease will appear.'

The technic of injecting salvarsan will not be described here, for I believe it to be the duty of the dentist, as soon as he observes the suspicious sore in the mouth, to consult with the family physician, who should inaugurate and follow up the specific treatment. Long very properly emphasizes a word of caution here. He says: "It may fall to the dentist to discover a case of syphilis, by mouth symptoms, where it had not been suspected, but he must be exceedingly cautious about discussing this finding with the patient. He is dealing with a matter for which he has not been consulted, and in any suspicious acts or words of his lie the possibility of much unpleasantness. If the patient be an innocent wife, a statement of his discovery might produce domestic discord. While she would have a most serious grievance, entitling her to our pity, a revelation could only add to her unhappiness. A suggestion that you find evidence of certain general conditions and that she had better see her family physician, would be the proper course; and even this advice must be given tactfully, without arousing suspicion as to the probabilities in the case, for, after all, a mistaken diagnosis is possible."

It is interesting, however, to know something of the history of salvarsan. For a great many years mercury had been the only specific for syphilis, except in the tertiary stage when potassium iodid is indicated. But unfortunately mercury in its curative dose is extremely poisonous, so that small doses have to be used over a long period of time. Because of this disadvantage many attempts have been made to discover a mercurial compound which would fulfill the ideal therapeutic requirement; viz.—to kill the spirochaete by means of a single injection. The nearest approach to this was the discovery of atoxylate of mercury by Uhlenhuth and Manteufel. By using this drug they were able with four injections to kill all of the spirochaete which were produced by local inoculation of the testicles in rabbits. Not only were four injections insufficient to have a like effect in man, but the doses required were much larger comparatively, and, as a result, toxic symptoms developed and recurrences were frequent; so atoxylate of mercury was never extensively employed. The discovery of this product, however, acted as a stimulus and spurred chemists on to further investigation.

It may seem strange to those of you who are more or less familiar with the drugs that have been employed in the treatment of syphilis, that the latest specific for the disease is a compound of arsenic and not of mercury. The formula for "606" is $C_{12}H_{12}N_2O_2AS_2$. Ehrlich claims that his discovery was due largely to the well-known fact that the compounds of arsenic exerted a far greater influence in sleeping sickness than did the compound of mercury, and it was for this disease that atoxyl was discovered. When it was shown in 1905 that syphilis was caused by the spirochaete pallida, a protozon which doubtless belonged to the same group as the germ which produces sleeping sickness (trypanosomes); and since arsenic had often played an important role in the treatment of syphilis, the later synthetic compounds discovered, of which atoxyl was the stimulus, came to be used for syphilis as well as for sleeping sickness.

Thus we are here afforded a practical example of what may come from the work of the committee of the National Dental Association on ''Scientific Research,'' of which your fellow-townsman, Dr. Weston A. Price, is chairman, and who is doing so much to place the work on a firm and solid foundation.

The manifestations of what is known as the *secondary symptoms* of syphilis do not begin to appear until from four to six weeks after the development of the hard chancre. If no treatment has been instituted, eruptions on the skin usually mark the beginning of this stage; and frequently quite similar eruptions are found on the oral mucous membrane. These eruptions are accompanied by fever, sometimes preceded by it. In some cases red spots, with darker borders, somewhat angular in form, are seen on the mucous membrane of both sides of the upper lip. They are not eroded and are not characteristic of syphilis; but are the mildest form of lesion involving the buccal mucous membrane in the secondary period of the disease.

Simultaneous with the eruptions and fever, characteristic *mucous patches* occur, and may be located on any part of the mucosa of the mouth regardless of whether the disease originates primarily or secondarily in the mouth. One patient, a waiter, 28 years old, had syphilis nine months. On the left side of the lower lip was an elliptical raised gray ulcerated mucous patch. On the upper lip, two ulcerated excoriations with a gray border. On either side of the frenum of the tongue, a flat elliptical ulceration with a yellowish-gray coating. Another patient's tongue was intensely red and swollen. The right half of the tongue was almost covered with mucous patches, more or less deeply ulcerated and covered with fibrinous membranes. On the left side of the tongue was a typical, faintly-shining, smooth mucous patch. The patient was twenty-four years old; the ulcers occurred in the early secondary period of syphilis, eight to ten weeks after the chancre. Zinsser claims this to be unusual.

The presence of mucous patches is a positive sign of syphilis; and before the discovery of the spirochaete pallida or the introduction of the Wassermann reaction, it was necessary to wait for the appearance of these patches before a positive diagnosis could be made. An aggravated canker sore might be mistaken for a mucous patch; and yet each is characteristic. With the mucous patch there is a sharp line of demarcation between the lesion and the healthy mucous membrane, pain and inflammatory reaction is generally absent; while canker sores are extremely painful and the immediate area is of a deep red color.

It should be remembered that the mucous patches are *exceedingly infectious,* generally containing the spirochaete in large numbers; and every precaution should be observed in spreading the infection. In order to understand why syphilitic manifestations are found in the mouth it is important to know that secondary and tertiary syphilis establish themselves with predilection and intensity on such spots as have been irritated and injured. For this reason secondary syphilis has an especial predilection for the mouth, as the mucous membrane and tongue are continually irritated by eating, drinking, biting, smoking, roughened tooth-surfaces, deposits, ill-fitting crowns and bridges, over-hanging fillings, etc.

Before the introduction of salvarsan, mercury was the one drug indicated in the treatment of secondary syphilis. The disease in this stage is manifested in the mouth and leaves its indelible effects upon the gums, jaws and adjacent structures, and mercury has a selective influence upon these structures. In fact, this drug is a *specific* for the secondary symptoms, though its action, as yet, rests purely upon an empirical basis. It is not even known whether the action of mercury is due to a specific toxicity which the drug may have for the spirochaete or whether it is simply due to its general effects upon metabolism. Sollmann is of the opinion that the former is the case and says, "that mercury is not only palliative, but curative in this stage—congenital as well as acquired—whilst its administration is worse than useless in the first and third stage." If the mercurial treatment is to be instituted, an accurate and positive diagnosis should always be made, otherwise disastrous results are almost certain to follow. Quite a few cases of necrosis of the lower maxilla have come under my observation following the administration of mercury in doubtful syphilitic cases. In one case of a little girl seven years old, a sequestrum was exfoliated which contained the erupted first permanent molar and the crowns of the unerupted first and second bicuspids. The case terminated fatally, without a positive diagnosis of congenital syphilis, as was suspected, ever having been made.

Syphilographers have learned from sad experience that mercury can be pushed much farther without producing ptyalism, if the mouth has first received a thorough prophylactic treatment. This includes the removal of all local irritants. In fact, it is only when the mouth and teeth are clean that the symptoms of ptyalism are valuable as an index that the system is taking all the mercury it can absorb without producing marked toxic effects. If the teeth are not clean and smooth and the mucous membrane healthy, it is best to wait until the mouth receives proper attention before attempting to find the minimum toxic dose of the drug; for upon the health of the mucous membrane of the mouth, to a great extent, depends the ability of the patient to take an efficient quantity of mercury without causing salivation.

In the past many dentists have hesitated to work for patients who were known to have the specific disease on account of the danger of self-infection, and thinking it necessary to subsequently discard all instruments used. On this point Logan says, "these syphilitic individuals can be cared for with impunity, if the operator protects his hands with rubber gloves and then scrubs all the instruments employed and boils them for fifteen minutes."

The third or tertiary stage of syphilis may be prevented if proper treatment has been previously inaugurated. In cases not so treated the *tertiary symptoms* usually occur in from one-half to two years after infection. *Gumma* mark this stage of the disease and first appear as hard bodies or nodes occurring mostly under the skin, although they may occur under the mucosa of the mouth. They gradually increase in size, become more superficial, with a tendency to break down and ulcerate. When they occur in the region of the hard palate, the underlying bone frequently becomes involved and extensive necrosis of the palate and nasal bones follow. Subperiosteal gumma are especially destructive to bone.

Authorities differ in regard to whether the lesions of tertiary syphilis are infectious. They are probably but slightly so, if at all; however, it is well here also to guard against possible infection. The one drug indicated in the treatment of tertiary syphilis is the great alterative, potassium iodid. In this stage of the disease the efficacy of potassium iodid is equal to that of mercury in the secondary stage, and may be considered a specific.

The question of whether syphilis can be cured or not has been a debatable one in the past, but its cure is no longer questioned by experienced syphilographers. Yet it may be safely stated that few cases are ever permanently cured, for only a small percentage of patients will continue the treatment sufficiently long, after they feel perfectly well, to effect a permanent cure. My experience has led me to believe that syphilis permanently stamps its indelible effects upon the osseous system, especially the bones of the jaws and nose of the individual thus afflicted in almost every case; and that in any subsequent infections, like in alveolar abscess or pyorrhea alveolaris, there is likely to be an extensive involvement of the osseous structures, and yield to the ordinary treatment with difficulty.

MERCURIAL STOMATITIS

This condition frequently follows the administration of mercury and its compounds for the treatment of syphilis and other conditions. Mercury is used for its alterative and tonic effects. As has been previously mentioned, it is a specific for secondary syphilis, and every dentist should be thoroughly familiar with the effects of this metal when taken internally. When small doses of an unirritating preparation of the drug are given continuously for a certain length of time, the first effects are observed in the mouth, for it has a selective influence upon the gums, jaws, and adjacent structures. There is produced an increased flow of saliva, fetor of the breath, redness of the gum margins, and pericementitis, causing soreness of the teeth when the jaws are forcibly brought together. If the drug is not withdrawn upon the appearance of these symptoms, the condition gradually grows worse; salivation becomes excessive (continual drooling); the gums become swollen and spongy; the teeth loosen from their sockets and may be easily extracted with the fingers; the tongue and parotid glands enlarge—the former sometimes to the extent that it protrudes from the mouth, often having deep sloughing ulcers made by indentations of the teeth upon its edges, also upon the mucous membrane of the cheeks; and, finally, the soft tissues around the teeth slough away, necrosis of the bones set in, and large sequestra form. This group of symptoms is known as *ptyalism* or *salivation*. In these cases the general health is naturally affected, the patient becoming pale and loses flesh. Chronic mercurial poisoning occurs frequently in workmen who handle metal or who are exposed to its fumes, such as makers of thermometers, mirrors, scientific instruments, etc. The condition, however, is too frequently produced by the prolonged use of mercury as a medicine. Citing a case of severe general ulcerative mercurial stomatitis: The entire mucous membrane of the mouth was red and swollen; the gums necrotic and covered with a yellowish membrane containing pus. Pus also could be pressed out of the alveoli of the teeth. The tongue was greatly swollen, and hollowed-out ulcers, covered with pus, seen along its edges at points opposite the teeth. The mucous membrane of the lips was very much swollen and ulcers caused by pressure from the teeth were seen. There was marked salivation and fetor.

In the treatment of mercurial stomatitis, discontinuance of the mercury and mouth hygiene generally clear up the symptoms, unless they are too severe. In the more aggravated cases, besides discontinuing the use of mercury and employing prophylactic measures, certain medicinal remedies are indicated. The *teeth should not be extracted,* unless so loose that they virtually fall out. Potassium chlorate, dissolved in cinnamon water (ten grains to the fl. oz.), may be used as a mouth wash. Atropin sulphate, administered in medicinal doses twice daily, will control the flow of saliva. The internal administration of potassium iodid is recommended, as it aids in the elimination of mercury by forming with it in the tissues the double soluble salt. When the pain is very severe, morphine sulphate may be given; and tonics are indicated to combat the exhaustion and anemia.

Many homeopathic practitioners object strenuously to the use of amalgams for filling the cavities in the teeth of their patients; some go so far as to order all amalgam fillings removed and fillings of other material substituted, in the belief that enough mercury is gradually absorbed to cause systemic disturbances. The idea is certainly far-fetched, for while metallic mercury can be separated from an amalgam by high compression or heat, it, nevertheless, is combined in the amalgam by a more or less definite chemic union. I have no positive proof to show that mercury cannot be thus absorbed; but by close observation in a long clinical experience no constitutional disturbances from this source have been discovered. The same objections are offered to the wearing of a red-rubber denture, because mercury compounds (oxids) are used as pigments for coloring the rubber. Surely, with the high heat necessary for vulcanization, the mercury would combine with the other elements to form such insoluble (non-absorbable) compounds that there would be no danger of systemic disturbances from this source.

ACUTE ULCEROUS GINGIVITIS

This is a comparatively rare disease. I have seen a number of cases in the mouths of children coming to the College Infirmary for treatment from the so-called "slum districts" of Chicago. This may have been a coincidence, but I have never observed the typical disease in well-kept mouths. It may be regarded as a filth disease. Gilmer well describes it as follows: "The disease attacks simultaneously the gum margins on their buccal or labial aspect about two, three, or possibly four teeth, at the same time. The ulcers come suddenly, quickly destroying the gingivae down to the alveolar process, but seemingly not invading it, exposing the roots of the teeth to this extent. The margins of the ulcers are everted crater-like, somewhat like chancrous ulcers. The base of the ulcers is overlaid with a grayish-white covering. When this covering is removed, the granulating surface bleeds freely. The lymphatics related to the area become enlarged, and, unlike chancrous lymphatic enlargements, are tender. It is also unlike chancre in that the ulcers are nearly always multiple and exceedingly painful to the touch. Salivation is much increased, with frequent drooling, the breath is fetid, and owing to the absorption of toxic elements, there is a slight rise in temperature. The contiguous lingual gingivae become reddened, but do not participate in the ulceration. The condition has been mistaken for syphilis."

The treatment of acute ulcerous gingivitis is both local and systemic. The local treatment consists in cleansing the ulcer with such agents as hydrogen dioxid, drying the part and applying a ten-per cent. solution of silver nitrate or a fifty-per cent. solution of argyrol. Simultaneously with the local treatment, calomel should be administered internally. If the ulceration is checked, complete restoration of the gum tissue by granulation follows. Mouth hygiene should, of course, be instituted and strenuously carried out.

A form of ulcerous gingivitis, somewhat resembling the above condition, frequently occurs in the mouths of young people, especially young men who are addicted to the habit of smoking. The gum in the interproximal space first becomes reddened, then is quickly followed by necrosis which extends around the teeth. The gingiva of all the teeth in the mouth may be simultaneously involved. The disease is exceedingly painful, sometimes accompanied by fever and loss of flesh, and, by the dentist who calls almost every disease of the mouth pyorrhea, patients, thus afflicted, have frequently been informed that they were suffering from the latter disease. Generally in these cases the teeth have been neglected, so far as prophylaxis is concerned, and an irritant of some character will be found about the necks of the teeth or under the free margin of the gums, this being about the only symptom that the disease has in common with pyorrhea. In these and all such similar cases the highly astringent pyorrheal remedies should not be employed. What is needed here is a thorough prophylactic treatment, the local application of mildly stimulating remedies, such as twenty-five per cent. solution of argyrol, and the daily use of an antiseptic mouth wash. If necessary, a cathartic should be prescribed. With the above treatment these disagreeable cases yield nicely.

TUBERCULOSIS

This dreaded disease is recognized today as the "great white plague." That you may know the change in the attitude of the laity toward this disease in recent years, I will call your attention to the fact that about fifteen years ago, when the campaign against consumption was in its infancy, the Hon. William E. Mason, then United States Senator from Illinois, introduced a bill in Congress asking for an appropriation of ten thousand dollars for the purpose of investigating the causes of tuberculosis and the best means of its prevention. The bill was held up, way-laid, and finally killed; and the spirit thereof was forced to travel that road which leads to nowhere and benefits nobody. In contra-distinction to this, it was authoritatively stated that during the year of 1911 the National Association for the Study and Prevention of Tuberculosis spent $14,500.00 for the purposes for which the association exists. Some twenty years ago Dr. W. D. Miller, of Berlin, conducted a series of experiments in which he isolated fifty-eight different varieties of germs in the human mouth. Many of these experiments were subsequently verified by Dr. G. V. Black, of Chicago. It is true, that not all of these germs are pathogenic in character, but many of them are; and prominently among the latter is found the germ which produces tuberculosis. Cultures taken from tooth-cavities almost invariably show the presence of one or more disease-producing germs. And why not? Where can you find a more nearly ideal incubator in Nature—pabulum from food remnants and decaying tooth-structure, body heat, moisture, and comparative freedom from disturbance. Out of two hundred mouths examined by Dr. Geo. W. Cook, one hundred and seventy-one show the presence of the tubercule bacilli. About two years ago Dr. F. B. Moorehed reported in *The Journal of the American Medical Association*, five cases of tubercular infection of the glands in close proximity to abscessed molar teeth, the inference being that the germ gained admittance through the canals of the teeth.

Tuberculosis is a preventable disease. But a few short months ago we were caused to shudder as we read about and thought of that terrible catastrophe on the sea, where fifteen hundred bodies were buried in the deep and fifteen hundred souls sent, unexpectedly, to their Maker. Yet we pick up the Bulletin of the Chicago Health Department of April 12th, 1913, and read that "more than one hundred and fifty thousand die annually in this country from this preventable plague. At the present time there are nearly one million victims of the disease, practically all of whom are going about spreading the infection." It is estimated that "in Chicago tuberculosis yearly kills about four thousand persons." I say we shudder when we read of a catastrophe; yet we read these, what should be startling facts, turn the page, and give it scarcely a thought.

Tuberculosis occasionally attacks the mucosa of the mouth. Gilmer, who has had an extensive oral surgical practice, reports having seen three cases, one of the tongue, one of the sublingual salivary gland, and one, an extensive involvement, including a part of the lips, the mucosa of the cheek, the soft palate, the tongue, and a portion of the pharynx. The microscope will aid in positively determining tubercular lesions of the mouth, as well as in other parts of the body.

One patient showed a tubercular infection of the entire mucous membrane of the fauces, soft palate and uvula. These ulcers arise from the confluence of numerous miliary tubercles. The ulcers are covered with yellowish white pus. Tubercle bacilli in this case were not found in the pus, but an extirpated portion of the mucous membrane, which was rubbed up with normal saline solution and injected into the peritoneal cavity of a guinea-pig, produced tuberculosis in the animal.

It may fall to the lot of the dentist to first discover a tubercular lesion in the mouth, and thereby aid in making a diagnosis; but the treatment had better be done by the general medical practitioner or specialist, for the cases are rare and no definite local treatment has thus far been established. Though it may be safely stated that the various forms of light have been used in many cases with favorable results.

LEUCOPLAKIA—BUCCALIS AND LINGUALIS

This is a disease of the mouth and tongue, the etiology of which is yet unknown. A large percentage of the cases of leucoplakia give a previous history of syphilis. It is, therefore, suspected that the latter disease has a causative relation to leucoplakia, though no definite evidence in this respect has been produced. Gilmer, who has seen a large number of cases, is of this opinion. He says: "Many cases of leucoplakia buccalis have come under my observation, and, with few exceptions, I was able to elicit a history of syphilis." The disease manifests itself upon the buccal mucosa, portions of the gums and the dorsum and edges of the tongue, and other places. There appears, sharply outlined whitish or silver-colored points, streaks, bands, or patches of irregular shape, either flattened or slightly elevated above the level of the general mucosa. Ordinarily they simply present a roughened surface without much discomfort. They occur almost exclusively in the mouths of men who are excessive smokers. The condition, however, should not be mistaken for that which is frequently seen in the mouth of excessive smokers, especially pipe smokers. where there is a whitening of extensive areas of the tongue or hard palate or both. The epithelium of the smoker's tongue is of a brownish-white, while in loucoplakia the patches are of a clear white color and are very characteristic; no other condition of the mouth presents the same clinical picture.

Leucoplakia lesions are painless and may be overlooked by the patient unless they become complicated with cancer. It has been observed that carcinoma frequently has its beginning in the site of an old leucoplakia patch. Since this is true an early diagnosis should be made, which is clearly within the province of the dentist who may note it before the patient. The patient should be advised to avoid all irritants, especially tobacco and alcohol, prophylaxis should be instituted and soothing mouth washes prescribed. The treatment of the disease itself should be relegated to the oral specialist or family physician. In cases of known syphilis the anti-syphilitic treatment would be indicated.

ACTINOMYCOSIS

This disease is common among the lower animals, especially cattle, and is known as *lumpy-jaw.* The disease affects the lower jaw and cervical glands, and cases in the human being have been reported by Brophy, Bevan, Zederbaum and others. It is due to an infection with the ray-fungus, which is normally found in grain and is supposed to find its way into the mouth from the habit of chewing on straws. The germ gains admitttance into the tissues of the mouth through decayed teeth. Blair states that, "the disease first manifests itself in the form of a small nodule, which for a time may give no trouble, but later softens and forms sinuses from which is discharged a thin fluid which usually contains the fungus." The microscope affords a positive means of diagnosis.

The treatment of the disease had better be carried on by the medical specialist, as it is so rare in the human being that dentists but seldom see the condition. Based on observations made at the Wisconsin Experimental Agricultural Station. Bevan introduced the copper sulphate treatment in man, and both he and Brophy report good results by using the drug to the limit of toleration. They begin with about one-quarter grain given three times a day, gradually increasing the dose to one grain. In addition to the internal administration of copper sulphate irrigations of a one-per cent. solution are also employed.

I shall not discuss here the disease commonly called pyorrhea alveolaris for two reasons: First, this disease, while it affects the supporting structures of the teeth, is more directly associated with the teeth proper than most of the diseases I have considered; and second, to discuss pyorrhea in its various details would occupy an evening by itself.

In this paper I have endeavored to emphasize the necessity of the dentist being on the lookout for these various diseases of the soft tissues of the mouth, which, in my opinion, have not been discussed in dental literature as much as their significance merits; and, consequently, dentists, as a rule, are not as familiar with their manifestations as they should be. We should all delve more deeply into the science of pathology, and then learning to interpret the clinical symptoms of these lesions we can apply our treatment or advise our patients intelligently. Surely this is not too much to expect of the trained dental practitioner of today.

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THE RETAINING SCREW VERSUS THE STEP FOR ANTERIOR TEETH*

BY H. W. ARTHUR, D.D.S., PITTSBURGH, PA.

WE HAVE SO FREQUENTLY extolled the retaining screw as a means of retention that we hesitate about again doing so, in so formal a way as giving a paper on the subject. We have, however, been constrained to do so for several reasons:

Recent utterances on the exclusive value of the step in the class of operation under consideration—incisors and cuspids involving the incisal angle—together with the fact that a much-quoted authority on the subject of operative dentistry does not even mention the practice, the retaining screw, as a means of retention: and again, an apparent want of appreciation of the profession at large as to the value of the practice.

We are somewhat at a loss to know why the practice has not met with more favor. The conclusion we have come to is, that this is probably due to ignorance of the method, or to the fact that some, having a knowledge of it, have failed to put it into practice, anticipating difficulties or, having tried it, have failed, owing to want of precision in the procedure.

Having proved the value of the retaining screw by long years in practice, we would like to convince others of its merits and value and by so doing show that by this means valuable tooth structure may be conserved.

Our contention is, that the retaining screw affords a maximum retention with a minimum loss of tooth structure, and that within the bounds of the cavity after the decay is removed, with no weakening of the surrounding structure, especially in the class of cavities under consideration, those involving the incisal angle. On the contrary, the step preparation is an extension of the bounds of the cavity, wasting sound tooth structure, weakening the enamel walls and, if extended over the enamel margins, the cutting edge, for protection, thereby exposing the filling, it is objectionable for esthetic reasons, all of which is avoided if the screw can be depended upon for retention.

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*Read before the Lake Erie Dental Society, 1913.

Admitting that the step is necessary for an all-porcelain or gold inlay, in the class under consideration, our judgment would be against the use of an inlay, entire.

We have found it good practice, meeting all the requirements for retention and esthetics, to fill the larger part of the cavity with gold, using the retaining screw, and facing with porcelain or some one of the silicates, thus avoiding the use of the step, with an assurance that we have a permanent operation.

On the presumption that there is need of information on the subject, we venture to furnish such by quoting from a paper we read on the subject some years ago, confining ourselves at this time to the class of cavities under consideration, those involving the incisal angle.

The first consideration is the point in the cavity where the screw should be inserted. It should be as far as possible from the pulp, not too near the margins of the cavity, in sound dentin and at points accessible for filling. In the incisors and cuspids, the one point preferable is the linguo-gingival angle—less preferable at the labio-gingival angle, more space being required here between the teeth and there being less body of tooth structure. A very desirable place is in the body of the dentin, near and parallel with the incisal edge, not encroaching on the enamel plates, labial or lingual. The requirement for this selection would be an open space. It would seem to be a simple operation to place a screw, and yet to be successful, care must be taken in each step and always.

The small anchor screw, 100 threads to the inch, is best suited to the class of cavities under consideration. For the anchor screw there is a set of instruments complete, that could not well be improved upon.

Having decided where we would place our screw, we should make sure that the way for direct approach is clear.

The first step in the manipulation is to counter-sink with a small round bur, No. 5, a seat for the filling at the point where the drilled hole is to be.

With a limit drill in the engine, carry the drill steadily up to the shoulder and then withdraw quickly while it is revolving. If allowed to stop it may break off in the drilled hole. Take the screw tap in hand, place it cautiously in the drilled hole, giving one or two turns. When it is engaged let it be free, so that it may line up with the drilled hole. Repeat this procedure with gentle pressure until the tap is arrested. It must be kept in mind that the instrument is a delicate one and may break in the hole if rudely handled.

We prefer the screw carrier with loose shank, because we can regulate the length of the screw, an important consideration, and by this the screw is held firm, so that in placing it, the thread on the wire or in the tooth is not liable to be torn. With the screw in the carrier, the procedure should be the same as with the screw tap, leaving the instrument free every few turns, so that it may ke kept in line with the drilled and tapped hole. When the screw is arrested, which fact is indicated by firm resistance, first loosen the handle by unscrewing from the shank, then unscrew the shank from the anchored screw. A word of caution—the drill and tap being more slender than the shank of the carrier, it must be borne in mind, in the preparation of the cavity, that room should be made for the shank of the screw carrier, so that it will not come in contact with the tooth, in the cavity nor at the margins.

The subject is not complete without some reference to the manipulation of the filling material about the screw. The object in making a seat for the filling in which the screw is placed, is to give stability to the filling and in a measure support the screw. This is accomplished by condensing the gold around the base of the screw, in the seat, following it up until the screw is covered, avoiding wedging the filling material between the screw and the cavity wall until there is outer resistance of the filling to aid in supporting the screw.

When we consider the limited amount of surface the screw presents, we can understand how necessary it is to condense the gold well around the screw to make it secure. For this reason we would advise the use of small pointed pluggers, straight and contra curved.

It has occurred to us that in a measure the secret of success with the retaining screw may lie in the use of heavy foil. Used in thin strips, unfolded, with small pointed pluggers, necessary to thorough condensation, each piece carried to place and at once condensed in the limited space around the screw, there need be little or no obstruction to vision—whereas, other forms of gold require larger plugger points and repeated efforts to thoroughly condense the gold, all of which is a menace to the stability of the screw during the procedure.

The use of the retaining screw will not admit of careless treatment, but to those who have the ambition to excel, and that in the best way, it offers great inducements.

THE FIELD OF METAL INLAYS*

BY H. A. IRION, D.D.S., COLLINSTON, LA.

THE OLD ADAGE which says "there is nothing new under the sun" is veritably true, for the inlay was originated some years ago, and has been exploited by various methods ever since its introduction.

Dr. Taggart, I believe, is conceded to have *first* introduced the inlay in its practical form, by the invention and distribution of his once-famous "casting machine."

All honor to Dr. Taggart, to whom we doubtless owe all credit for those later and more simplified methods which have succeeded to the present time.

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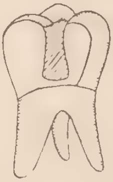
*Read before the Louisiana State Dental Society.

It is not my purpose or aim to revert to any of the early discoveries, or pursue the practical experiments which have led us up to the present stage of knowledge, to where the scope is now so wide that each must choose for himself, but to suggest, in my humble fashion, a few of those principles and practical methods which will open this yet unperfected system to possibilities and accomplishments of which, like Horatio in all his philosophy, we ''ne'er ha dreamed!''

Now, gentlemen, I have no thought of wearying you with any long dissertation anent the *theoretical*, and, *on paper* application of metal inlays; but will attempt, in my own rude fashion, to present for your comment, *some* of the personal experiences which I have both suffered and



By the employment of a ''core'', wax is readily withdrawn in a single piece, without distortion through the coronal opening. The cut represents the approximal view. Only the normal separation such as is employed for an ordinary amalgam filling is necessary. By this method ''inlays'' can also be cast of *any* desired thinness without any handling of the wax impression, thus allowing the advantage of great economy in gold in large restorations.

enjoyed, and at the same time endeavor to give you some idea of the methods by which I arrived at certain results, which have been entirely pleasing—if not to anyone else, at least to myself—which I shall submit later for your full criticism.

I was first attracted to the inlay by a series of articles running in *The Digest* several years ago, contributed by Dr. Conzett, of Iowa; Dr. Conzett stated that he could teach *any* man in 30 minutes how to introduce a *perfect* contour foil filling—and in the same article lamented the fact that a good friend and neighbor dentist had resorted to this so-called ''inlay,'' because, as he acknowledged, he could not *perfect* large gold contours in foil, therefore he had adopted the ''inlay''—much to the disgust of Dr. Conzett.

I felt myself somewhat deficient in large contour restorations in foil, and therefore hailed Dr. 30-Minute Conzett with much delight. I promptly communicated with him; but alas! only to the effect that I should peruse a series of articles which he would contribute to the succeeding numbers of *Dental Digest.* I have never since read a number of that journal.

I decided at once that I would embrace the ideas of his discredited ''confrere'' and seek for attainment in the inlay. The *final* results have been happily pleasing. My experiments and practical applications have led me to enthusiastically conclude that there is absolutely *no* case of disintegration of the dental members that cannot be more easily and *perfectly* and *quickly* restored by the inlay method, than by any other *known* process.

I would submit that in large compound cavities in molars, *especially* those embracing the *disto*-approximal surfaces and extending deep beyond the gingival margin, there is *no dependable* procedure *except* the inlay, properly introduced.

Several years since I devised a simplified process of applying the inlay. I visited the City of New Orleans and *first* demonstrated my method to the now lamented Dr. L. D. Archinard—at that time and until his death, if I mistake not, professor of operative dentistry at the Tulane Dental College—from whom I received a hearty endorsement. The method was also commended by a number of other prominent dentists in that city.

During the interval, however, I flatter myself that I have improved my time, and *believe* that I have something better now than I displayed then.

Time does not allow me to go into any *details* regarding what I consider this most important subject. I have here a few specimens which I offer for your examination, criticism and interrogation.

I could have very easily prepared many more, but it has been my experience, and I doubt not the wisdom, that exhibits presented *out* of the mouth, receive but small favor.

It is true, in this as in all exhibits, that the results are more perfectly accomplished upon the dead and removed organ than upon the live and sensitive member. But be that as it may, the *principle* still applies!

I had intended to present for your examination a few practical cases to demonstrate what I have conceived to be an achievement of no small value in metal inlay, but owing to the difficulty of assembling these *living* exhibits I must resort to a few *dead* ones, which are now among you, subject to your judgment and your discussion!

The accepted method, so far as I can learn, for the correct preparation of cavities for inlay is square base, parallel walls and margins, *sharp* and *well* defined, with coronal opening larger than cervical base, so as to facilitate, without distortion, the ready withdrawal of wax impression.

The *principle* is highly to be commended, if there were none better; but since it is obvious that to parallel walls and eliminate overhanging margins and natural under-cuts, as we normally find them, means great destruction of healthy tissue, principally involving in these cases the corona of enamel which nature, in her great wisdom, has thrown up to protect more susceptible *approximal* surfaces, it is for us to conserve these God-given sentinels and not ruthlessly destroy them with chisel and bur in order to produce a so-called "up-to-date" piece of dentistry!

The inlay is unquestionably here for *all time*, and is not only affording us a method of *quickly* introducing large metal restorations, but opens for us a field of aseptic and hygienic perfection, through which *source* I believe we will ultimately attain the Goal of *Ideal* Restoration. Smooth and beautiful in contour, offering with its well burnished margins, the highest resistive force against the bacillus of caries; *no* method is comparable to its beauty and *none* equal to its simplicity. In durability it has no peer, and from the point of asepsis, it has no equal.

FORTY-EIGHTH CONVENTION OHIO STATE DENTAL SOCIETY AT TOLEDO

HEALTH AND SCIENCE CONFERENCE

A notable feature of the recent meeting of the Ohio State Dental Society was the Health and Science Conference Dinner held at the Commerce Club, Toledo, on Wednesday evening, Dec. 3d, 1913. Dr. Weston A. Price, President of the Society, acted as toastmaster. Governor Cox was represented by his Secretary, Mr. G. F. Burba, who spoke on the subject, ''The State and Dental Science.''

Dr. Homer C. Brown, President of the National Dental Association, spoke on the subject, ''Greetings from the National Dental Association.''

Dr. Victor C. Vaughan, Dean of the Medical Department, University of Michigan and President-elect of the American Medical Association, gave an interesting and instructive address on the subject, ''How Dental Infections Reach Other Organs and Tissues.''

Dr. Edward C. Kirk, Dean of the Thos. W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, and editor of *The Dental Cosmos*, spoke on the subject, ''Exact Knowledge and How it is Obtained.''

Dr. E. F. McCampbell, Secretary of the State Board of Health, spoke on the subject, ''The Relation of Dentistry to the Health of the People.''

Aside from the speakers the special guests of the evening included the entire membership of the State Board of Health, Dr. J. H. J. Upham, President-elect of the Ohio State Medical Society, and Dr. C. D. Selby, Secretary-Treasurer of the Ohio State Medical Society.

There were also present many prominent dentists from other states. The dinner was attended by nearly five hundred. The conference was a great event, of which the Society members should feel proud, and one that will be a lasting benefit to the dental profession.

The proceedings will appear in full in *The Dental Summary*, the first installment of which is appended hereto.

Commerce Club, Toledo, Ohio, Dec. 3, 1913.

Dr. Price: In the last fifty years the world has been literally turned upside down because a band of men found a key, and that key made it possible for the death rate or, rather, the life rate, to be changed from an average of twenty years fifty years ago, to an average of forty years at this time; and that key which has turned the world upside down and doubled the longevity of people living today was found in the scientific research laboratory, and this meeting tonight, is, in a sense, in recognition of the effort of the National Dental Association to establish, if possible a means for removing from humanity those afflictions that come because of oral and dental lesions. If you were to go to the museums in Colorado Springs and examine the skulls of those cliff dwellers, you would find, if they are now as they were a few years ago, not a single instance of decay in all the skulls and you would find that practically all the arches are symmetrical. Humanity has been advancing, but she has lost the art of living, and this key is to unlock the door that we may again find the art of living. I want to say to these guests, and we have some very honored ones here tonight—we have the entire Board of Health of the State of Ohio; we have in the absence of our Chief Executive, his Secretary, Mr. Burba, our Governor at a late moment being unavoidably called to Washington—and while we regret very much that he cannot be here, we recognize that his Secretary has the spirit of our Executive. We have also the President-elect of the American Medical Association, an honor than which there is none greater that will ever be offered to any human being in this world, because the American Medical Association stands at the zenith of that personal quality that expresses itself in sacrifice and in the giving of all it can instead of getting all it can.

I want to say to these guests that the members of the National Dental Association, constituting virtually the dental profession, are alive to their responsibility. They realize that they have a large part in the unlocking of this door, and you may be surprised to know that we dentists are undertaking to finance a project that will equip laboratories, and make it possible for men to go into laboratories, without concern for their bread and butter, and work out these problems. In fact, they are already working, and those who were present this afternoon, I know were thrilled and stirred by some of the reports that were given in those scientific papers, of some of the results already secured by the money that has been contributed in part by men in this room. And the dentists of Ohio, as usual, are leading. Of the magnificent sum of $20,000 contributed already by the dental profession of America, $9,000 is from the dentists of Ohio. Now, tonight we want to cultivate our relation with this great Empire State. We want to learn from our Chief Executive or his representative our duty toward the humanity of this State. We want also that the Executive may know something of our desire to help the humanity of the State. We want to learn from men who have made it their life work to study to unlock these doors what are the methods for exact study. So, without further explanation, I am going to introduce to you a man for whom I can say nothing better than that the greatest reward that is ever offered to any man for service is a better opportunity for a better service, and that is what we have given to Dr. Brown. Dr. Brown, as Secretary of the National Dental Association, when he was Secretary, was capable of carrying forward a campaign of reorganization that raised the total membership of the National Dental Association from some 800 or 900 members to 12,000 members. What could be a more fitting reward than a greater opportunity for a greater service, namely, to be made President of the National Association in order that he might, in that position, direct the work of that Association; and Dr. Brown, the first dentist to occupy the position of member of a State Board of Health will now extend to us greeting from the National Association.

GREETINGS FROM THE NATIONAL DENTAL ASSOCIATION

BY THE PRESIDENT, HOMER C. BROWN, D.D.S., COLUMBUS, OHIO

It is a distinct privilege, in behalf of the National Dental Association, to extend cordial greetings to the Ohio State Dental Society and her guests, and also to publicly commend and congratulate the officers and committees for presenting such an excellent program for this 48th annual session.

It is doubtful whether any other dental organization has ever been so fortunate in having as many interdependent interests represented as constitutes tonight's program, and I am quite sure that I voice the sentiment of every member of our National Association in stating that the Ohio Society is most fortunate in this, and that we have every reason to assume that this meeting will be a stimulus that will result in marked benefits in many ways.

My position tonight is rather an embarrassing one, since I am extending greetings to the first dental society with which I became affiliated. Twenty-two years ago I joined the Ohio State Dental Society and I will mention two regrets in connection with such membership. The first is, that I did not immediately become active in the affairs of the organization and second that I have attended only twenty-one of the twenty-two meetings held since then. I personally know most of our members as well as our guests, and most of these are probably aware that I never received any medals as a public speaker and I naturally feel at a decided disadvantage in appearing on the same program with our distinguished speakers of the evening; therefore, my embarrassment.

In this connection I desire to impress upon the younger members of our profession, and this applies alike to other professions and vocations, the advantages of becoming affiliated with your local, state or national organizations and assuming your full responsibility in each. In no other way can you hope for a full measure of success and I am frank to say that whatever professional success I have attained, or whatever service I may have been able to render our profession or state in any official positions I hold or may have held, I attribute much of this to my affiliation and active interest in our society work and the willingness to make any necessary sacrifices in order to do my full part.

I am not unmindful of the signal honor which has been conferred upon me, and through me the profession of Ohio, by being elected the first President of the reorganized National Dental Association, and I fully appreciate all the responsibilities associated with this preferment, especially at this particular time. However, with the loyal support of all, which I earnestly solicit and hope to receive, I propose to assume and discharge my duties to the best of my ability and to the best interests of the Association as I see them, and will at all times endeavor to be just to all and lenient with those who may differ as to policies.

For the benefit of those who may not be informed relative to our National Association, it may be of interest to state some facts which should be convincing that our profession was never so favorably situated for advancement as it is at this time. Heretofore, we have had only some seven to eight hundred members while under our reorganization we feel confident that our membership will approximately be twenty times this number for our 1914 meeting which will be held at Rochester, N. Y., July 7th to 10th. That we are confronted with an auspicious future should readily be appreciated when it is understood that our National Organization has, with few exceptions, every State Society as a constituent thereof, with some 15,000 of the most progressive and aggressive dentists laboring not only to advance conditions within our profession, but also striving to educate the public to a better appreciation of the necessity of a healthy mouth as an important factor in health conservation.

No doubt the first thing that will best advance the interests of our Association will be the publishing of a National Dental Journal. The reason for this is because of the fact that it is necessary to have a medium by which our members may be kept in touch with the affairs of the Association. Another important work is that of our Research Commission, of which many of you heard Dr. Price speak last night, and no doubt will further discuss this tonight. Other important national questions are as follows: Relief Fund, Dental Education, Legislation, Oral Hygiene, Public Health and Public Dental Education. All of these have active committees working out the various details and the solution of these questions will mean much to the progress of our profession.

Ohio has always been conspicuous in all progressive movements and her former citizens are today occupying positions of trust in other states and nations and there is no exception to this in the progress of the dental profession. The American Dental Association was organized at Niagara Falls in 1859 and Ohio was doubly honored by Dr. William H. Atkinson being elected President and Cleveland selected for the place of the meeting in 1860. Dr. Chapin A. Harris, the man most responsible for the establishing of the first dental college in Baltimore in 1839, formerly practiced dentistry in Ohio. The second dental college was established in 1845 at Cincinnati. Ohio has the second oldest dental organization in existence today; passed the third state dental law, shared honors with Pennsylvania in publishing the second dental journal, and has furnished the profession many notable characters who have been called to their reward, such as: James Taylor, Jonathan Taft, George Watt, William H. Atkinson, John Allen, F. H. Rehwinkle, W. D. Miller, H. A. Smith, and others. We are optimistic enough to think that some of our dentists present tonight may very ably continue the work of these dental pioneers, and those from other states, and that their names may be recorded as having rendered faithful service.

Some are fortunate in the possession of wealth; some are called to positions of honor and influence; some are blessed with a surplus of energy and time, and some are qualified to formulate plans and execute progressive policies for the good of the masses. All of these may be considered as talents, entrusted to the individual, and he who gives of his purse, his influence, his counsel, his energy or time with a view to improving conditions for the present or future generations, is generously contributing to a worthy cause and his closing days will be brighter for having rendered some real service for the uplift of humanity.

> "There's a destiny which makes us brothers,
> None takes his away alone;
> All that we send into the lives of others,
> Comes back into our own."

Dr Price: We have had executives of state and national honor who have striven to make health and happiness for their people, but none who appreciated the relative merit of the tree or the horse as compared with the human element; but Ohio has the proud distinction of having a Governor who places at the top of the pinnacle of all that is to be desired, the health of the human element, and in Governor Cox (Applause) and in his representative, Mr. Burba, we have the highest expression of a civilization that would save its people rather than its poultry and its trees. We will now hear from Mr. Burba. (Applause).

THE STATE AND DENTAL SCIENCE

BY GEORGE F. BURBA, COLUMBUS, OHIO

SECRETARY TO THE GOVERNOR, JAMES M. COX

Mr. President and Members of the Ohio Dental Society: I want to congratulate your President upon his introduction of the representative of the Governor. I am so used to hearing myself introduced as the shock absorber of the Governor that it is a distinct pleasure to me to hear something else. (Laughter). I believe, however, that I have one of the happiest positions in the world. They told me when I went to Columbus that all I would have to do was to look pleasant and speak softly. I had been used to doing both all my life as a newspaper man. My position can only be compared with that of the Irishman who was hired to tear down a Protestant church. He said he was actually getting paid for it. (Laughter). All my life I have been handing out this kind of stuff, and now I am getting paid for it. (Laughter). Ordinarily, all that I have to do with occasions of this kind is to tell you that the Governor has been prevented officially from being with you. I cannot lie to that extent tonight, because official business had nothing to do with his not being here. He believed that the best way he could serve the dentists of Ohio was by encouraging a large corn crop, and he went with the Corn Boys. (Laughter). Personally, I would have been glad to have had Governor Cox with you this evening if for no other reason than to let you look into the face of a Governor, the first Governor in the American Commonwealths who has said to the health authorities of the world that dentistry should have a place upon the Board of Health of the State. (Applause). Now, for fear that you may think that this is politics—and everything that one in office does is attributed to politics—I want to say to you in all sincerity that as his editor for more than eight years he has hammered into me, time after time, as Dr. Custer here, my good friend from Dayton, can testify, "Burba, why don't you write more editorials upon the importance of people looking after their teeth?" And I made a fight in his own paper for dental inspection of the schools of Dayton, and we expect to keep up that fight until every child in every school in the State of Ohio has its mouth examined by competent dentists. (Applause).

Governor Cox's subject was "The State and Dental Science, How Each Can Help the Other." Now, if you will pardon me for telling you something you already know, I want to go into this subject of government just a few moments. I shall not tell you anything you don't know, but it is well for us occasionally to go over these things in our minds, so that we will know something about government, so that we may more fully appreciate government, and realize what our duties are toward government; and I am going to tell you briefly the evolution of government. There have been, since the beginning of time, only three general forms of government; Monarchial, Aristocratic and Democratic, or Republican, which is one form of Democratic government.

Let us carry out a government in our own minds, and see how it evolves, so that we may find our place in our government. Let us suppose that you and I, two or three of us, are shipwrecked upon an island where there is no government; there are no other inhabitants except us three. We have no government; we need no government; I am not going to do that which you do not want done, and you will not do that which I do not want done. That presupposes right there that government is a power, a restraint. Government is an instrument, or a method of making one or more men do what one or more men want done, or of restraining one or more men from doing that which one or more men do not want done.

So we three on this barren island want no government, we need no restraint or compulsion. But presently there is another shipwrecked crew upon this island; men and women also are cast upon it. And one day you and I after an absence return and find our rude hut torn down, and the stream from which we obtained our water supply polluted, and our camp disrupted by these newcomers. Now there is need for a government. These people must be restrained from tearing down our property, and from polluting our streams. You being the bolder of the lot, seize a club, and go to the newcomers and tell them they *must do* certain things and *refrain from doing* certain things. Thereby you have established the first government, a monarchy, with yourself as monarch, an absolute monarch; and you rule that island so long as that club holds good and your strength remains. But presently these newcomers and their descendants create an aristocracy. There can be an aristocracy of anything—of wealth or brains or religion. An aristocracy of religion is called a theocracy. That is another form of government, but it comes under aristocracy. Or, we will say that presently the descendants of these newcomers have tamed and collected goats; they have an aristocracy of goat owners, and they won't associate with anybody who does not own goats, and they believe that only those owning goats should run the island. So the goat owners or aristocrats chase the monarch off of the throne, and set up an aristocracy. That would be your second form of government, and that is the way it is always followed. In England it was not goat owners; it was land owners; but it was an aristocracy that controlled England.

After a while a lot of people who do not own goats, who are not aristocrats, feel that they must have something to do with government. Their rights are being infringed, and things are not moving well with them. So they make war upon the aristocrats and chase them from their offices, and establish democracy, wherein all the people rule. That is what we did, in substance, in 1776. We chased King George and his aristocrats out, and established here in this country a democracy or a republican form of government which simply means that you and I, unable to go to Columbus and make the laws which we desire, elect representatives, and send them there to make laws for us.

I have claimed for years, and written about it repeatedly, that every city in the United States, every state, and every sub-division of every state, has exactly the kind of laws which it deserves. Every community in this country is governed by as good people as it deserves to be governed by, however much they may be grafters, because the majority of those people are honest, the majority of the human race are honest, and if the majority do not go out and vote for honest men, then they should be controlled by a corrupt minority.

Now, under our form of government we cannot all go before the Legislature, and tell the Legislature what we want in the way of laws. We must have organizations of one kind and another. Men whom we elect to office, however good they may be, may be unacquainted with issues that subsequently arise. For instance, you may elect a member to the Legislature upon a certain issue, and he will be diligent upon that issue; he is the best man you could find upon that issue. But while he is in office a new issue arises, one undreamt of by him or by you. Now it is necessary for you to make known to that representative your attitude upon this newly arisen issue. All of you dentists here could not go. Suppose that after you have elected your representatives, an issue involving the practice of dentistry should arise in the Legislature. All of you could not go to Columbus and tell your representatives what you want. So if you are thoroughly organized; if you have a President and officers who are doing their duty, and that President and those other officers know that you stand back of them, it is only necessary to send one or two men to Columbus and let him or them speak for this whole body. In statecraft or politics—it is the same thing, although the politicians have brought statecraft into disrepute—there is no better way of reaching your representative than through organization—that is, by your own dental representatives and by your medical representatives. I know that if any one of you, Tom, Dick or Harry, should come into the executive office and tell Governor Cox or a number of the representatives that you, as John Smith, would like to see a certain law passed or not passed, in the common language of the day it would "cut very little ice," because there are a million of you in this state and you speak for but one. But when you go in there and say, "Governor, I represent the dentists of the State of Ohio, and in the name of these dentists I ask that you veto that bill," Governor Cox gives that the consideration which any man should give it.

I have been at Columbus for some months, and I have seen the inside workings of politics, and I happen to knew that those interests which are the best organized receive the most consideration at the hands of the lawmakers of this state. Aside from your social pleasures which you may derive from your organization, aside from the technical knowledge and learning which you may gain from these annual meetings, I assure you that it is a duty which you owe to yourselves to organize the dental profession so thoroughly, so concretely, that one man can go to Columbus, and say, "I represent the dentists of Ohio," and mean it. But some of you say, "Why should it be necessary for anybody to go to Columbus to intercede in behalf of just laws which are proposed? In fact, why should we have laws compelling men to do their plain duty?" It is unfortunate, but it is no less a fact, that men must be compelled to do their duty to their own families and to their fellowmen. There is no dispute, no gainsay, but what education is the greatest of all blessings that ever came to a people, and yet today we actually have to have a law compelling men to send their own offspring to school. If we did not have that law, a lot of people of this state would grow up in ignorance. So that men have to be literally compelled to do their duty. Men have to be compelled to send their children to a dentist. Men have to be compelled to do a thousand and one things which in the calmer moments of your life you would say, "Well, if he doesn't see fit to do that, let him go."

You dentists have not upon the statute books the laws which you should have, or rather, we, the people of Ohio, have not yet upon the statute books all of the laws which we should have. There are any number of measures regulating the health and welfare of the people which must yet be written, and Governor Cox wants the aid of the dentists of this state in helping him to write those laws.

A few days ago, in the privacy of his office, when he was talking to me about coming up here, he said: "If I had the school teachers of the state and the doctors and the dentists back of me, I would give the people of the state such a citizenship in the next generation that would make ancient Greece, with all her learning, pale into insignificance." Then he turned to me, and asked the question, "What couldn't we do if we had those three organizations, the school teachers and the doctors and the dentists, with us upon all these humanitarian laws which are proposed?'' For that reason, because I know he could tell it so much better than I can, I am indeed sorry that Governor Cox is not here this evening to tell you some of his propositions. I want you to permit me to digress long enough to tell you something I have learned about political machines. If ever you ''have it in'' for a Governor, you let him build up a machine, let him get all the offices that he can to appoint men to. He is fixed. Every time the Governor appoints a man to office we have to put up the fly screens to keep the brickbats from coming through from men he did not appoint to office. If Governor Cox is not re-elected, in the event he should run, you may attribute it to the fact that the Legislature passed some laws enabling him to appoint men to office. This day and age a machine will fly into your face, and every cogwheel in it will hit you four times a day. There isn't any Governor or anybody else who can build up a political machine at this time that will amount to anything. Personally, I wish there were not an appointive office on earth. I've got mine, you understand. (Laughter). It is unfortunate for any Governor who is trying to do things to have to appoint men to office. So that you need not believe that Governor Cox wants to ''work'' you dentists some way, in order to appoint two or three of you to office. He knows that a good many of the rest of you would throw brickbats through the window.

The gentlemen here referred to the fact that Governor Cox thinks more of human beings than of animals. That is true; but he thinks a lot of animals also. He sees no reason why they should not all get along together, the asses and the horses, and the hogs and cows, and the other kinds of animals, all of us in Ohio. (Laughter).

Some time ago, after Governor Cox was elected, he found that this state was spending a fairly goodly amount of money for the prevention of hog cholera, which is well spent. But he found that there was none being spent for the serum for diphtheria. If you have a hog somewhere which is threatened by the cholera, and will write to the Governor tomorrow, in the course of a little while you will receive some serum paid for by the state with which to vaccinate that hog to prevent cholera. But if your child is suffering from diphtheria, and you write for that serum, they will tell you they have no money for any such work. You must pay for that yourself, and get it where you can.

Now it occurred to Governor Cox that it was not exactly right that we should do so much in stamping out disease among the hogs and cattle, which we are doing, and then do nothing to stamp out disease among our fellowmen; that if we could give $1,000 to a fair for the promotion of live stock and fast horses, we should be able to find some way to give $1,000 to a district to promote better and healthier children. With that in view, he has undertaken to work out what some people call humanitarian laws. They are very simple indeed, and mean only that the poorest child in the state ought to receive, and will, if he can bring it about, as good dental treatment, and as good medical treatment, as the wealthiest. (Applause).

Some years ago, a noted physician from Vienna came here to treat Miss Lita Armour. He was an expert in hip diseases. Governor Cox was in my office that day, or one day when he was reading reports from this case, and he said, "Isn't it a shame that only one child in the United States can have the benefit of this great man's service?" He was in sympathy with that little Armour child, but he was also in sympathy with all of these other little children who could not pay Dr. Lorenz's fees and have him brought over here. Gentlemen, it is a travesty upon civilization that one little girl can be cured of hip disease, as she ought to be, and some other little girl, as beautiful, as pure and as holy as the little Armour girl, must limp through life with a diseased hip, because her father did not have the money to pay the bill. (Applause).

The other day Governor Cox hit upon a scheme which I will mention here for the first time, because it has not yet been published, which he hopes to bring about. He sent some men to study the universities of Ann Arbor, Michigan, and Madison, Wisconsin, and Champaign, Illinois. One of those men returned, and said to him, "Governor Cox, they have a splendid plan at Ann Arbor. We found that in that state there is, in connection with the Medical College, a hospital which treats crippled children. They gather up these crippled children and take them to Ann Arbor, and there they are treated, with the best surgical operations and maintained free of charge." And the man's face lightened up when he heard that, and he said: "There is a chance for every little girl, in this state, to receive the benefits which Miss Armour received, and if I can put it through the Legislature, I will have established at Columbus, in connection with our Medical College, a hospital to which every crippled child in Ohio can resort for treatment." (Applause)

(To be continued.)

As a whole, the Toledo meeting is considered the most important, most interesting and most successful in the history of the Society. The attendance was large, the interest in the proceedings keen and sustained, and the results will be far-reaching and lasting. Much credit is due to the officers, to the members of the Program and Clinic Committees, and especially to the local committee for their untiring and efficient work, before and during the meeting.

The publication of the proceedings will be continued in the February number, and completed as rapidly as possible.

BUSINESS SUGGESTIONS

Our readers are urged to send business suggestions for this department that there may be an exchange of ideas that will be mutually beneficial. Send all contributions to the editor,

L. P. BETHEL, 195 SIXTEENTH AVE., COLUMBUS, OHIO.

THE BUSINESS SIDE OF DENTISTRY

BY "A BUSINESS MAN"

DENTISTRY AS A PROFITABLE MONEY-MAKING PROFESSION.

This subject is one which ought to be of especial interest to every practitioner, and it shall be the purpose of this article and others of the series which will follow, to render to the dentist such help as is possible by suggestion and advice.

There are many things that might be said which would require volumes to make clear, but there are a few suggestions which, if followed out, will work to the advantage of the average dentist. Let me say, parenthetically, that this does not apply exclusively to dentists either, for it applies with more or less truth to the other professions as well. This for the encouragement of the dentist—for, if misery loves company, the poor dentist cannot complain of being lonesome.

Without doubt many of the statements which follow may be considered by many as self-evident and therefore unnecessary to be said. Probably this is true. Nevertheless, there may be an occasional thought advanced from a somewhat different angle than before considered which will afford an atom of helpfulness and in this hope these articles are respectfully submitted.

It often has been said and with more or less truth, that dentists, as a rule, are poor business men and many in the profession admit this to be so.

There are various reasons for this, but in my opinion the main reason is that the average dentist has had no opportunity to acquire business training either before entering the profession or afterwards. Most dentists were sent to school. Upon completing their high-school course they were immediately sent to Dental College, and while there for three years they were busy acquiring the technical end of dentistry at the expense of some one other than themselves; and it was not necessary to earn a particle of the money that kept them there. Upon completing the prescribed course they entered immediately upon their professional career.

During all this time they were in no position to learn business methods or even to learn the value of money. Money to them did not represent energy; it merely represented purchasing power.

It is not surprising, therefore, that when the average dentist enters upon his professional career he meets many obstacles and difficulties of which he little dreamed. It is hard for him to immediately adopt good business methods and it is often hard to acquire them afterwards.

THE DENTIST'S ENJOYMENT IN HIS WORK.

No man should permanently remain in any line of work that is distasteful to him. There are so many avenues of work that every man should be able to find the one most conducive to his happiness and success. No man can do his best work unless he is in love with it and thereby enabled to work without a feeling of dissatisfaction while engaged in it, or with results that flow from it. No dentist should continue in the profession if he does not enjoy the work.

The successful men who are at the head of things, who achieve results, who are acknowledged leaders and captains, enjoy their work, and it is not a task for them in any sense of the word.

A dentist, therefore, should not follow the profession merely because it is the "trade" he has learned, but he should love it. He will then serve himself best and his patrons as well. To enjoy one's work, surroundings should be as pleasant and the equipment as complete as possible that they may contribute to his pleasure.

THE DENTIST'S BUSINESS METHODS.

Many dentists work to their own disadvantage in that they seem to divorce as far as possible the financial end of their business from the professional end. Money is the great essential to all good business. It is the only substance that successfully lubricates the wheels of progress. Let one's earning capacity be what it may, his ability to do things where money is involved is limited to his ability to capitalize that earning capacity.

I have heard of dentists who would refuse cash when proffered by a patient, and that is never good business. Usually, the dentist who would refuse money, is one who actually should have had it and needed it and the chances are that later on when he tried to get it he was unable to do so. Such a man is entirely different from one whose wall bears a sign which I have seen and which reads: "Deposit required. Balance will be accepted while the work is being completed."

While many dentists are in the work because they love it, money is absolutely essential and unless a charity case, and so understood, the dentist should see to it that he receives the money due him and according to agreement. He should not let his patient consider that time for any period is his unquestioned, undisputed right, and the dentist should not be made to suffer as the result of his intended kindness.

A dentist should not run accounts with any who are known to be irresponsible, neither should he run risks with people with whom he has no acquaintance without learning what their reputations are for paying their bills. The man who deliberately defrauds his creditors does not deserve to have your good work put into his mouth and you cannot afford to take chances with him. Insure yourself against loss. Remember, all losses of every sort come directly out of the net profits and if an irresponsible patient *must* be accommodated, let your competitor do it.

One is not only required to earn and collect but conserve as well. We hear a great deal about conservation these days but conservation of our earnings is as necessary in our business economics as is the conservation of our natural resources to our national life and progress.

A professional man must derive from his practice during his active years a competency for those years when his income is reduced or cut off by his retirement. To do this he should practice all of the arts and business methods of any other business man in preparation for it.

It is an acknowledged fact that dentists prove pretty "easy picking" for the average promoter of every sort; gold, oil, coffee, copper, rubber, stocks of a multitude and variety of forms are attractively exploited; and while it is conceded that some of them are good and many make money, one may rest assured that any *sure* thing need not go begging for investors. For instance, there is enough capital in Colorado to finance all the gold mines of that State; and if the men on the ground will not invest, the dentist a thousand or more miles away better keep his hands off. Your banker will be a good adviser; go to him. As a rule good bank stock, government or municipal bonds and real estate prove the safest investments, and an interview with your banker will enable you to invest where the returns, while possibly not quite so large as the plausible promoter promises, will be much more certain. The average dentist has not the time to look personally after the affairs of any concern with which he might invest money. It therefore behooves him to be absolutely certain that the investments are safe before putting his money into them.

One of the most pathetic cases that has come to my personal attention recently is that of a dentist who practiced for a great many years and enjoyed a very large business. He died a few months ago and the estate was not sufficient to give him a decent burial; but in his safe were so-called securities that cost him thousands of dollars, which were absolutely worthless. Had that money been safely invested instead of thrown away, this man would have been wealthy and left an estate from which his own family and the community at large would have derived benefit. As it was, his own family was deprived of the money that he should have had and no one but a set of scoundrelly rascals who were promoting fake securities were benefited.

I know, personally, very many cases similar to this where dentists in an effort to "get rich quick" have invested their earnings, taking unusual risk and have lost. A dentist, like any other business man, will do better by being content with the earnings from his office and investing only in securities where no special risks are run.

(To be continued)

PERSONALITY AN ASSET IN DENTAL PRACTICE.*

BY DR. J. P. MARSHALL, ST. LOUIS, MO.

In presenting a paper before this Society on this subject it is not my intention to treat the matter in all of its phases, for that would take a great deal of time, but simply to indicate some of the reasons why it is my opinion, as well as the opinion of many other men, that *personality* plays a major share in the making and maintaining of a successful dental practice, as in fact it does in all other professional callings where the individual comes into direct contact with those whom he serves. As our profession is one that is bound or governed by a code of ethics which bars us from the field of advertising in the securing of our patronage, our outlook for the building of a business is very much narrower than that of any individual entering any mercantile line. That brings our business-getting elements down to three essentials, viz.: technical knowledge, adaptability, or I might say the ability to apply that technical knowledge in a practical manner, and the personal traits of the individual which will either draw or repel the public with whom he comes in contact.

We have all been taught that our success and future recognition as progressive integers in our chosen field depend wholly upon our ability to make anatomical restorations for pathological conditions in the oral cavity that would be pleasing esthetically, and stand up under all of the abuse and misuse to which they are bound to be subjected in the unprophylactic and unsanitary mouths of the majority of our patients.

I will grant without any argument that we must have technical knowledge of a high degree, and that we must be able to apply that knowledge in a practical way in order to succeed; but it is quite as essential that there be victims on which to display our unusual ability.

Take the young man who has nothing but his diploma and his confidence to recommend him; he opens an office over the corner drug store and sits down to wait. The first man who enters his office seeking professional service very likely goes there because he had such a violent toothache that he could not wait to visit his old dentist. He did not come because of the young man's reputation as a skillful operator, for the simple reason that the young man does not, at that time, possess a professional reputation, either good or bad. Now we come to the point, for we grant, for the sake of argument, that the patient had service rendered other than for the aching member, and that he went home and recommended the young dentist to his family, and possibly the next day to his business associates. Now I ask why did he permit the young doctor to perform other services than that which he originally intended to have him perform, viz., an emergency treatment? Not because of the young man's skill, for of that the patient is in the majority of instances not able to judge at all; not because of the lasting quality of the operation performed, for sufficient time had not elapsed for that to be determined; but simply and solely for the reason that *the personality* of the dentist pleased him. While very few of our patients are competent to judge of the merits of our various operations, every man, woman and child that enters our offices is instinctively a judge of personality to a greater or lesser degree, and must inevitably leave the office with some very definite opinion of the dentist, and the character of these impressions is the main factor to determine our success or failure.

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*Read before the St. Louis Society of Dental Science, 1913.

Ruskin says: "Courtesy is to human personality what fragrance is to flower, its chiefest charm." The absence of this makes man a clod and the rose-bud rubbish. Matthews, in his very interesting book "Getting on in the World," says: "Courtesy is the chief element in gentility; no man possessing it can fail to get on in the world, while he that is wanting it need not tarry long to get off the world. It draws all ages to it and repels none. The child is won at a glance and even the aged draw near for its softening effects. Its chief seats are in the eye, the voice and the hand. In this trinity of truth-telling interest strangers meet to part as friends."

Next to *Courtesy* comes *Gentleness*. Gentleness never offended any man and it will win every woman and every child that comes to your office. The whole animal kingdom can be tamed to lie at the feet of him who himself has been subdued by it. The counterpart of gentleness has sent thousands from the dental chair to the street, highly resolved to avoid forever a re-encounter with him who cared not for the torture his rough hands were inflicting upon nerves already inflamed to an almost unbearable degree; and just keep in mind that gentleness is one of the handmaidens of personality.

Another element that goes to build personality of the winning type is *sympathy*. Sympathy is like a medicine; it may not be wise or best to employ it in every case, but it should be kept always at hand whenever men, women or children, tortured with pain and nervous irritation are seeking relief.

It is a mistake to think that there is no place for the display of this feeling except at the bed-side of the dying. It is Nature's first impulse where pain is present. Born of it are all the great eleemosynary institutions of the world, and it should not be left out of the character and conduct of the dental practitioner who hopes to make a success of a profession which deals very largely with the sufferings of mankind.

Cleanliness is one more attribute that is necessary to make a wholesome personality. Cleanliness of your office surroundings, cleanliness and neatness of your person, and above all a clean mind are about the greatest assets in the building of a personality that will test out 24K fine.

To *Courtesy, Gentleness, Sympathy* and *Cleanliness* let us add one more essential and that is *professional candor and honesty*. These are things that make for practice-building and are the essentials that, possessed by any one, will secure him patronage in this or any other profession. Then, after we have secured a practice through the medium of personality we must call upon our skill to assist in the maintaining of it, for though we may be able to increase our clientele through the widening influence of personality, yet we must give full value for the money that we receive in payment for our services.

In conclusion I wish just to remind you that in your own experience you can recall two men, one with an unusual amount of skill as an operator but with a personality that repels rather than attracts, who is struggling along the best that he can with little or no practice and the other a man across the street who is only an ordinary operator but is rich in a personality that attracts and makes a friend of every patient that enters his office and they go their way singing his praises. I know of such cases and I have no doubt that you do also.

I believe and I feel you will agree with me that more attention should be given in our schools to the matter of developing the personalities or the latent qualities that will go to make personality of the real and winning sort in the young men whom they furnish to the profession.

Sixth International Dental Congress—London, 1914

Nature and Scope of the Museum.

It is intended that the Museum in connection with the International Dental Congress shall be an international collection of objects of interest and be representative of every Section of the Congress. Its nature and scope include the following:

1. Specimens showing the Evolution of Tooth Forms and Dentition of Man. Histological Preparations. Exhibits illustrating the Chemical Composition and Physiological Action of the Saliva.

2. Specimens of Morbid Conditions of the Teeth, Palate, Gums, and Jaws, Photomicrographs of Oral Micro-Organisms, and Cultures of Micro-Organisms. New Bacteriological Apparatus and Appliances.

3. Specimens of Teeth, Gums, and Jaws affected by "Pyorrhea Alveolaris." Microscopical and Lantern Slides of the same. Exhibits of Various New Methods of "Inlaying" Cavities in Teeth. Exhibits of New Methods of "Crowning" Teeth.

4. Radiographs of the Normal Dental Tissues; of Diseases of the same and Associated Parts.

5. Exhibition of various kinds of Articulators. Specimens showing the various Methods of "Pressure Casting." Specimens showing modern forms of Continuous Gum Work.

6. Models showing Abnormalities in position of the Teeth and Appliances for their correction.

7. Specimens illustrating Methods of Dealing with Surgical Conditions of the Teeth and Jaws, including Cleft Palate, Harelip, Fracture and Resection of the Jaws.

8. Specimens illustrating the History and Evolution of Anesthesia.

9. Photographs, Charts, Diagrams, Specimens, and Statistics of School Clinics. Methods of the Instruction of the Public in the Principles of Oral Hygiene.

10. Instruction Forms, Charts, Diagrams, Specimens, and Demonstration Models used in relation to Dental Education.

11. Historical Objects of Interest, such as Books, Instruments, Pictures, etc.

For further information address: Mr. F. N. Doubleday, Hon. Secretary, International Dental Museum, University of London, South Kensington, London, S. W.

EDITORIAL

TALKS TO PROSPECTIVE PATIENTS.

Dentists often make a mistake in thinking that the *price* for operations to be performed is the one thing that most influences patients to accept their services, and they are often too willing to explain to prospective patients how reasonable their charges are. It is more business-like to explain to prospective patients what is really needed to restore the defective teeth, or pathological conditions of the mouth, to a normal state, to insure better mastication, a more hygienic condition of mouth and teeth and consequently a more normal physical condition itself. Instead of beginning with the probable expense of work to be done the dentist should first get the favorable attention of the prospective patient, for attention sustained leads to interest; and interest augmented leads to desire; and desire made strong enough leads to action. These are well known psychological laws; and when in your talk you have brought the patient to the point of desire or action, then is the time to quote your fee if you choose to set a price in advance, or if you are charging by the hour for services rendered.

When you have impressed upon the prospective patient the benefits that he or she will derive from your operative restorations, naming a good fee will not stagger the patient, as would the mere announcement of the expense of the work to be done, without first explaining the benefits or creating an interest in what is to be done or a desire for the service.

Patients understanding these things and having a desire for them, and being in a receptive mood, will either act at once, accepting your service, regardless of the fee, or give your proposition due consideration without a feeling that the dentist is trying to "sting" them with exorbitant charges. The dentist deserves good fees and is entitled to them; but there is a limit, and this each man must determine for himself.

The dentist should not lose sight of the fact that business methods are necessary to obtain better fees and to keep patients satisfied.

The dentist, like the man of commerce, should recognize the law that *confidence is the basis of all trade,* and that to command confidence and keep it he must keep satisfaction, and to keep patients satisfied the dentist should render a service that will be value received for the fee he is charging.

By following these suggestions one is making a practical application of the seven principles in the psychology of business, *viz.*: Favorable attention, interest, desire, action, service, satisfaction and that begetting confidence. It seems to the writer that these "business suggestions" can be used to good advantage by every dentist in his daily practice.

THE RECENT MEETING OF THE OHIO STATE DENTAL SOCIETY

The 48th annual meeting of the Ohio State Dental Society, held in Toledo Dec. 2, 3, 4, 1913, was one of which all its members should feel proud. It was the best meeting, in every way, that the Society has held. The essayists and clinicians were dentists of recognized ability and they gave the Society members something worth while. The progressive clinic idea was well received and will probably be used in subsequent meetings.

The president, Dr. W. A. Price, gave a meritorious address on Tuesday evening calling attention to some of the many lines of research in which he has been engaged. The Wednesday evening Health and Science Conference, to which we have referred on another page, was an admirable feature. The meeting was a success from every viewpoint and the attendance was the largest ever recorded at any meeting. All of the proceedings will appear in THE DENTAL SUMMARY as soon as they can be gotten into shape for publication. Three hundred dollars was appropriated for the use of the Committee on Education and Oral Hygiene, with specific instructions that the Society should receive proper credit in all printed or published matter for the work carried on at the expense of the Society. Arrangements were made for a more extended campaign of publicity in oral hygiene, the work to be done, as far as possible, in conjunction with the medical profession, the Anti-Tuberculosis Society and other organizations having similar aims.

The report of the committee on the Miller Memorial shows that the fund now contains $4,683.44, and the committee was instructed to make preparations for the dedication at the semi-centennial meeting in 1915. The report of the Committee on the Public Dental Library, at Columbus, shows that the number of bound volumes is now 1,423.

The sale of Dental Relief Fund Seals at the meeting was authorized and $50.00 was appropriated for the fund.

The number of members registered was 493, the largest ever registered at any meeting. The total attendance was much larger than this.

The report of the Organization Committee* shows an increase, through new societies, of 155 new members. The total number of new members received during the year was 262.

Officers elected are:

President, J. K. Douglas, Sandusky.

First Vice-President, Edward C. Mills, Columbus.

Second Vice-President, T. I. Way, Cincinnati.

Secretary-Treasurer, F. R. Chapman, Columbus.

Board of Directors for two years, M. H. Fletcher, Stanley Smith, L. E. Custer, J. J. Welker.

Columbus was selected as the meeting place in 1914.

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*Published on another page.

REPORT OF THE ORGANIZATION COMMITTEE, OHIO STATE DENTAL SOCIETY[*]

The Organization Committee appointed at the December, 1912, meetings of this Society, begs leave to make the following report:

Of the fifty-five counties without the jurisdiction of Component Societies at the date of our appointment, the following disposition has been made:

1. The Ohio Valley Denal Society organized at Middleport, Feb. 5, 1913, including Athens, Vinton, Meigs and Gallia Counties.
2. The Corydon-Palmer Dental Society organized at Youngstown, March 10th including Trumbull, Mahoning and Columbiana Counties.
3. The Northeastern Ohio Dental Society organized at Ashtabula March 13th, including Ashtabula, Lake and Geauga Counties.
4. Coshocton, Muskingum and Guernsey Counties Dental Society organized at Zanesville June 26th including the counties of their names.
5. The North Central Ohio Dental Society organized at Cedar Point July 23d including Ottawa, Sandusky, Erie and Huron Counties.
6. The Southeastern Ohio Dental Society organized at Marietta October 29th including Morgan, Noble, Monroe and Washington Counties.
7. The Western Ohio Dental Society organized at Piqua Nov. 12th including Darke, Shelby and Miami Counties.
8. Richland and Ashland Dental Society organized at Mansfield Nov. 19th including counties of these names.
9. Lorain County Dental Society organized at Elyria Nov. 20th including county of this name.
10. Wayne County Dental Society organized at Wooster, Nov. 29th including Wayne and Holmes Counties.

The above ten new societies with a prospective society to be organized during this meeting (Wednesday afternoon, Dec. 3d) to include Williams, Fulton, Defiance, Henry and Paulding [†]Counties will, in the minds of your committee, eventually include in their membership every ethical dentist within the thirty-four counties covered by their jurisdictions. This assertion is based upon the enthusiasm and good fellowship so manifest at the organization meetings. Owing to lack of transportation facilities and the inability of men getting together in sufficient numbers to form a good working organization, at the request of your committee the following societies have increased their jurisdiction as follows:

Summit County Society to include Portage County.
Stark County Society to include Tuscarawas and Carroll Counties.
Hocking Valley Society to include Hocking County.
Rehwinkel Dental Society to include Clinton County.

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[*] Given at the meeting of the Ohio State Dental Society, 1913

[†] This Component Society was organized Dec. 3d, and merged into the Maumee Dental Society.

Central Ohio Society to include Hardin.

Clark County Society to include Logan, Champaign, Madison and northern portion of Green Counties.

Butler County Society to include Preble County.

Medina County, owing to transportation facilities, seems to be in concurrent jurisdiction of the Cleveland and Summit County Societies.

Clermont, Brown and large portion of Highland and Warren to be included in the Cincinnati Dental Society.

Miami Valley Society to include Green.

It has been the desire of your committee to include Seneca County in a consolidation of Wood County and Hancock County Societies.

Jefferson, Harrison and Belmont Counties we hope to organize into a component in the near future. A trip to Licking County on February 12th and subsequent efforts to organize Knox and Licking Counties into a component was without effect.

The expense incurred by our Committee to date is $246.92, which sum has been more than taken care of by dues received from the 155 new members to the State Society through the newly organized components.

For the purpose of conserving our present interests and co-operation in legislative matters, your committee would strongly recommend the following:

1. That a minimum membership of twenty entitle a Component Society to a member on the Board of Directors of the State Society. Owing to transportation facilities in several sections of the State and the impossibility of some three or four societies acquiring a membership of 25.

2. That a legislative committee be added to the list of committees prescribed by the Constitution and By-Laws of Component Societies this committee to co-operate with a similar committee of the Ohio State Dental Society.

In submitting this report, we desire to include our expression of thanks to the many men throughout this newly organized territory for their substantial and loyal support and assistance to your committee. Sincere thanks are also due to Drs. Price, Whitslar, Clark, Weaver, Bush, Callahan, Bethel and Kendall for assisting in programs of meetings; to the chairman of the Membership Committee for co-operation and to many others for expressions of encouragement.

EDWARD C. MILLS, *Chairman.*
J. K. DOUGLAS.
F. R. CHAPMAN.

Pulp Cavities, etc. There is no better anesthetic than nitrous-oxide and oxygen for use in cases in which drilling into pulp cavities and simply opening up the antrum is to be done. The absence of all jactitation and irregular breathing renders such operations far easier of performance than when nitrous-oxide is used free from oxygen.—*Sir Frederic Hewitt.*

SOCIETY ANNOUNCEMENTS

Minneapolis District Dental Society

The Minneapolis District Dental Society will hold its annual meeting at the Masonic Temple, Minneapolis, Jan. 16 and 17, 1914. From the data now at hand this promises to be a gathering of many of the best men in the country. We have succeeded in obtaining such prominent names on our program as Dr. W. H. De Ford, of Des Moines; Dr. C. M. Work, of Ottumwa; Dr. M. L. Ward, of Ann Arbor; Dr. L. P. Haskell, Dr. Grace Rogers Spalding, of Detroit; Dr. Adolph Gropper, of Milwaukee, and Dr. D. M. Graham, of Detroit.

We cannot help but feel that this meeting will afford a clinic really worth while and accordingly extend a most cordial invitation.

A. A. ZIEROLD, *Secretary.*

Texas State Dental Association

The thirty-fourth annual meeting of the Texas State Dental Association will be held at Fort Worth, Texas, April 13, 14, 15, 16 and 17, 1914.

In addition to the regular program the Oklahoma Post-Graduate plan will be tried at this meeting.

Dr. George H. Wilson, of Cleveland, will present Prosthetics, with special reference to anatomical occlusion, and Dr. Frank H. Skinner, of Chicago, Pyorrhea, Prophylaxis and Removable Bridge Work in connection with same.

For information relative to space for exhibits, or as to clinics, address Dr. W. H. Nugent, Fort Worth, Texas. Any other information will be cheerfully furnished by the Secretary.

FRANK FORMAN, *President,*
Waco, Texas.
J. G. FIFE, *Secretary-Treasurer,*
Dallas, Texas.

Illinois State Dental Society

The fiftieth annual meeting of the Illinois State Dental Society will be held at Hotel La Salle, Chicago, March 23, 24, 25, and 26, 1914. Chairman of Chicago Program Committee, Dr. Geo. N. West, 32 N. State St., Chicago; Chairman Exhibit Committee, Dr. P. B. D. Idler, 209 S. State St., Chicago. Dr. Henry L. Whipple, Secretary, Quincy.

HENRY L. WHIPPLE, *Sec'y.*

National Association of Dental Faculties

The annual meeting of the National Association of Dental Faculties will be held at the Iroquois Hotel, Buffalo, N. Y., January 26, 1914.

Executive Committee meeting at 9 A. M.; general session at 10 A. M.

B. HOLLY SMITH, *Chairman, Executive Com.*
CHARLES CHANNING ALLEN, *Secretary.*

Minnesota State Dental Association

The thirty-first annual meeting of the Minnesota State Dental Association will occur in Duluth, August 6, 7, and 8, 1914, at which time the officers of the Society unite with the Duluth men in promising a most instructive and enjoyable meeting. BENJAMIN SANDY, *Sec'y.*

Canadian Dental Association

The Canadian Dental Association meets for the first time in Winnipeg, Manitoba, May 26 to 29, inclusive, 1914, and a convention of unusual interest and profit is expected.

M. H. GARVIN, *Secretary.*

Announcement

Mr. and Mrs. F. J. Guinall announce the marriage of their daughter Grace Gertrude to Dr. Earle Simpson Braithwaite, of Chicago Junction, Ohio, on Saturday, the twenty-seventh day of December, nineteen hundred and thirteen at Clyde, Ohio. At home after January 30th, 314 West Pearl street, Chicago Junction, Ohio.

When a bit of sunshine hits ye,
After passing of a cloud,
When a fit of laughter gits ye,
And' ye'r spine is feelin' proud.
Don't fergit to up and fling it
At a soul that's feelin' blue,
For the minit that ye sling it
It's a boomerang to you.

—CAPT. JACK CRAWFORD.

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

WHAT IS DOING IN THE SOCIETIES

The Southwestern Michigan

Battle Creek, Mich., Nov. 19, 1913.—The Southwestern Michigan Dental Association held its annual convention here Nov. 17, 18 and 19, with 78 members present. Several interesting clinics were held including one by Dr. C. J. Lyons, of Jackson, (Mich.) who extracted an impacted third molar at the Battle Creek Sanitarium, assisted by Dr. W. A. Giffen, oral surgeon, Detroit, and Drs. B. R. Parrish and S. M. Fowler, of Battle Creek.

The patient was a man, sixty years old, who had worn both upper and lower plates for twenty years. For several months he had suffered from what physicians diagnosed as facial neuralgia. The case finally came to the attention of Dr. Parrish, who brought it before the clinic. An X-ray examination disclosed the unerupted molar, encrusted in cancellous bone within an eighth of an inch of the angle. The imminent danger of fracturing the mandible, made it necessary to remove the bone, both above and below the molar with chisel and engine bur, so that when drilling was finished it was possible to remove the tooth without the exercise of force. The operation consumed seventy minutes, the subject rallying soon after its conclusion. His condition, at this time, presages full recovery.

Dr. Giffen, of Detroit, demonstrated a new nitrous-oxygen machine with a woman as patient and removed the third lower right molar, under gas, in fifteen minutes and the patient was conversant with the operation which was without pain or annoyance. Among the new dental appliances on display at this convention, were the chairs of the Ritter Company, and three local dentists placed orders for these chairs. On Monday afternoon the members of this convention were the guests of the Postum Cereal Company, Ltd., at the mammoth pure food plant and saw Grape-Nuts and Postum and other food products being made. Later they were invited to view the private art collection of Mr. C. W. Post and had lunch at the main cafe before returning to the city. On Wednesday night the management of the Battle Creek Sanitarium gave the members in attendance a banquet in the main dining room, which did not close until a late hour.

Samuel A. Lewis, of Kalamazoo, was elected President. Other officers are: Dr. B. R. Parrish, Battle Creek, Vice-President, and Dr. R. A. Bowie, Three Rivers, Secretary and Treasurer. Bowie was re-elected. The Association voted to join the National Dental Association and took steps to prevent any but reputable dentists from joining.

The Indianapolis Society Affiliates

Indianapolis, Ind., Dec. 9.—Howard R. Raper, Superintendent of the Infirmary at the Indiana Dental College, addressed the annual meeting of the Indianapolis Dental Society at the Denison Hotel last night, on the subject, "The Treatment of the Teeth," following the usual dinner given by the Society. Through an amendment to the constitution, which was passed at the meeting, the Society became affiliated with the Indiana State Dental Association, and each of the members became a member of the National Dental Association. The officers who were elected for the coming year are: J. V. Howard, President; C. R. Jackson, Vice-President; Roy L. Bodine, Secretary, and George V. Underwood, Treasurer. The Board of Directors include E. L. Mitchell, I. L. Furnas and T. A Kimberlin; the Board of Censors include F. T. Applewhite, R. W. Blake and G. J. Pell.

The Fox River Valley Society

Aurora, Ill., Dec. 9.—Dentists from Aurora, Elgin and other Fox River valley towns attended the annual banquet and election of the Fox River Valley Dental Society last night at the Ward Hotel in Elgin. The program included a paper by Dr. J. A. Bullard, of Chicago, on "Bridge Work with Inlay Abutments." Dr. B. J. Cigrand, of Batavia, was also called upon for a short talk.

Officers chosen for the next year are: President, B. J. Cigrand; Vice-President, O. C. Prideaux; Secretary and Treasurer, G. O. Kerfoot.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXIV FEBRUARY, 1914 No. 2

OFFICIAL ORGAN

The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

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L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

THE CAST GOLD INLAY AND ITS ADVANTAGES*

BY A. J. BUSH, D.D.S., COLUMBUS, OHIO

PROFESSOR CROWN AND BRIDGE WORK, ORTHODONTIA AND METALLURGY, STARLING-OHIO MEDICAL UNIVERSITY

AT THE PRESENT TIME cast inlays are used about as freely as amalgam and their employment has rather suddenly become the most popular operative procedure in dentistry.

The generous welcome accorded to the cast inlay method upon its announcement was in part due to the preparedness of the professional mind to receive it. The quick recognition of its practical nature no doubt was very largely due to the previous and almost universal acceptance of methods in practice and of cavity preparation especially, which seemed to be in perfect harmony with the requirements demanded in the successful employment of the casting method.

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*Read before the Lake Erie Dental Society, 1913, also, by request, before the West Virginia State Dental Society, 1913.

All of the elements fundamental to the successful controlling of decay by filling operations were already established and accepted by nearly all, and the adoption of this method, which demanded so little change of thought in this regard, seemed to lend itself most favorably as a method, the very nature of which was in perfect accord with progressiveness.

It is not only a remarkable process with a wide range of usefulness, offering a field of wonderful possibilities, but it is also surrounded by a history that is remarkable.

It seems, according to late developments, that the disappearing model was first used in a crude way by the Aborigines for reproducing objects of art, etc., and the present process of making dental castings has been a slow growth of methods well known to art and science for many centuries.

I started to use the cast inlay process soon after Dr. Wm. H. Taggart made his announcement, as I think most of you did, about six years ago.

It was indeed a mighty announcement that was heard throughout this broad land and the glad tidings spread like wild-fire to the utmost corners of the dental world.

I hope we will all live to hear many such announcements. I hope every generation of our profession will be blessed by at least one announcement of equal importance.

Perhaps no one achievement has ever been recorded in the entire history of dental art that surpassed this process in value. No public statement of achievement ever so thoroughly or profoundly enrapt the attention of the profession as did the simple announcement of this process. Probably never before has the profession been so quick to comprehend the value of any process, nor so eager to avail itself of its benefits.

I think most of the profession must have lain awake nights endeavoring to invent casting machines -for never before has she proven so ingeniously resourceful and never before have the demands of a progressive idea been so abundantly supplied with facilities.

Casting machines of all sorts and shapes, answering to all shades and degrees of simplicity and efficiency beset us on every hand. Really, one was in danger of losing caste in his community unless he let it be known that during his spare moments he was secretly perfecting a world beater.

The process invaded every branch of the art of mechanical dentistry until every faculty of the professional mind was quickened in appreciation of its evolutionary character which promised to revolutionize operative procedures and mechanical methods.

Truly it is a process that seems exhaustive in its adaptability to meet the requirements of scientific dentistry, and unquestionably the greatest stepping stone that humanitarian dentistry ever welcomed save anesthetics.

Why all this sudden activity and commotion over a process, while previous to Dr. Taggart's announcement we were apparently contented with our advantages? Why did thoughts of possibilities before undreamed of suddenly inject themselves into our minds and demand so much consideration after his announcement? The answer is clear to me. I do not think that the great profession of dentistry shied at only a shadow. I believe she really saw something for the first time and was startled by its strangeness and amazed at its possibilities.

Still, they say the process is an old one. Dr. Simpson, of Dodge City, testifies that he placed an incisal tip for a young man years ago, and like Rip Van Winkle the boy had grown to be an older man, when Dr. Taggart waved his magic wand and we saw very clearly for the first time that which before was withheld from our vision.

But regardless of its history, regardless of to whom the profession owes its debt of gratitude or upon whose head credit should rest, regardless of who first conceived of it, perfected or announced it, how welcome it was and what a blessing to humanity it has been!

The cast inlay in principle presents a strikingly distinctive departure from former methods; a radically new idea in construction that has already been characterized as the "Ideal Method."

ADVANTAGES.

The chief advantage of the gold inlay methods in general over ordinary gold filling methods, is found in the principle underlying the method of construction. Gold inlays in general, and the cast gold inlay in particular, are essentially laboratory productions, in which the patient is spared the nerve racking tension of long and tedious sittings which are often necessary in performance of ordinary gold filling operations.

INDICATIONS AND CONTRA-INDICATIONS

Much has been written regarding the indications and contra-indications governing the use of inlays.

All, of course, are expressions of individual ideas based upon personal observations and clinical experiences in which the personal equation is inherent and inseparable. Accordingly, there are differences of opinions among teachers and confusion in the minds of students.

If we eliminate the personal equation, which I just got through saying is inseparable, and consider the universal properties of matter and methods of construction in general, and the characteristic properties of inlay materials—operative procedures and technics in particular, then we will get at the basic factors upon which indications and contra-indications have their true foundation.

For instance: The dividing line between the indications and contra-indications for porcelain inlay seems to be well defined. Esthetic considerations furnish the chief reasons for their employment, and friability the chief reason for their non-employment.

Frequently, however, porcelain inlays can not be placed where otherwise they might be used, because of certain conditions that are unfavorable and often prohibitive to the successful management of the matrix.

The dividing line between the indications and contra-indications for gold inlays with a matrix seems to be about as well defined and about the same except that the considerations are reversed regarding its properties and application.

The limitations surrounding the management of the matrix for gold inlays are substantially the same as for porcelain except that the difficulties encountered in carrying the matrix to a successful issue, more frequently than in the former case, prohibit its use.

The utility of the cast inlay seems to be unlimited. However, there are limitations which render their universal employment inadvisable. Whenever they cannot be used successfully without the seemingly unnecessary sacrifice of sound tooth tissue and the repair can be more properly effected in some other manner in accordance with economy, then the cast inlay should not be used. The cast inlay then is contra-indicated in this case, but the contra-indication is found in a *condition* and *not* in the *method* or *material* employed.

Formerly inlays were considered to be confined to a more or less narrow field of usefulness, principally on account of the difficulties surrounding the management of the matrix, but since the introduction of the cast gold inlay, which dispenses with the matrix, the field has been wonderfully broadened and now probably occupies the position of major consideration in the field of reparative operations.

Whether the power of the gold inlay to prevent the recurrence of decay will prove less, equal or superior to the more established reparative methods, we do not know at the present time, but we do know that the possibilities are very promising, and whenever failures do occur I think it is more than probable that most frequently the cause can be traced to faulty cavity preparation or imperfct adaptation to cavity margins, or poor or improperly mixed cement, or all of these. To say that the failure was due to the improper selection of the case or method, is sidestepping a responsibility.

If a gold inlay has the power to prevent recurrence of decay in a third molar, it certainly has the same power in the case of a central incisor, and if gold fillings are sanctioned in the anterior teeth, why are not gold inlays also? Failure in either case is not sufficient reason for condemning the filling material or for raising a question as to the selection of the case, or for saying that it was contra-indicated.

The primary consideration involved in the word "indicated" relative to an operative procedure is, in my judgment, a recommendation of some operation which is ample and will save the situation.

Decay may so deplete the crown of a tooth that we may say that a filling is contra-indicated and a crown is indicated.

A central incisor may present a small proximal cavity, in which case a filling is indicated and a crown contra-indicated.

Each is recommended on the principle that it is ample and will save the situation in accordance with the best plan of economy.

A filling is indicated on the principle that it contains all of the essentials of a remedy, but it will not prove successful unless it is skillfully made, and skill is a factor separate and apart and is not an inherent property possessed by the filling material.

I shall not say therefore, that cast gold inlays are indicated, but I will say that when fillings are indicated, cast gold inlays when skillfully made possess great possibilities as a reparative method and their power to control decay compares very favorably with other fillings.

GOLD INLAY COMPARED WITH GOLD FILLING

In judging the merits of the gold inlay we very naturally turn to the gold filling as a standard of comparison.

Occasionally we hear of a gold filling that has given service for forty years or more. I think it is very improbable that this will ever be said of the gold inlay.

Cement is the strongest factor of the inlay and at the same time the weakest.

The power of the inlay to control decay is gained by virtue of the cement that retains it, and the inlay in this regard acts only as a protector to the cement, the fullest degree of protection being gained by minimizing the amount of cement through perfect adaptation of the inlay to the cavity walls, and especially to the cavity margins.

The power of the gold filling to control decay is gained not only by perfect adaptation to the cavity walls, but chiefly by the grip of the elastic walls on the adapted surfaces of gold, as they are wedged between them. No objections can be raised to the density or resistance of cast gold or its alloys in comparison with the probable specific gravity and resistance of a perfectly malleted gold filling. We may, therefore, in comparing these two methods, eliminate the material from consideration, and we may also eliminate cavity preparation without seriously affecting the comparison.

With these factors removed, the question seems to resolve itself into two propositions—first the possibilities the two methods afford in the successful control of decay, and second the degree of permanency of this control.

The possibilities of the first method to control decay by virtue of perfectly adapted gold foil against elastic cavity walls of retentive form with force sufficient to make the sustaining grip of the wall permanent, seems to have been demonstrated beyond question.

The possibilities of successfully controlling decay by approximating surfaces of cast gold to cavity wall of unretentive form and depending upon the adhesion of cement for its retention, also appears to have been successfully demonstrated.

It is through a consideration of the second proposition, therefore, that we come face to face with the real question of vital interest.

It will take time, however, to decide this question of relative permanency—but while we are waiting for the years to pass until Father Time can decide this item of permanency, why not compile data which can be used in deciding this question according to the law of averages, which in my judgment will yield information of real human interest and more to the point? We cannot escape the personal equation. It enters into every operation.

A perfect gold filling is the product of specialized skill of the highest order. Many operators can, with scientific accuracy, produce perfect gold fillings which may last forty years or a life time. Many others make gold fillings which start to leak the minute the rubber dam is removed, and I believe the great law of averages will place the average time limit of service closer to the one minute than it will to the forty years.

I further believe that the law of averages will show that a greater degree of success will be accorded the efforts of the great majority of operators through use of the gold inlay whose power to control decay depends upon cement, than will be accorded their effort to place a like number of gold fillings whose power to control decay depends entirely upon the resultant product of skill.

In other words, average skill plus cement should produce an inlay which will control decay longer than a gold filling produced by average skill alone.

In treating upon the methods employed in cast inlay work—including operative procedures and technics involved, it will be necessary to divide the subject for convenience into, first, cavity preparation; second, formation of filling in wax; third, investment; fourth, casting; and fifth, setting. My treatment of this subject, however, will be abbreviated with the intention of taking it up more fully as a part of my clinic.

CAVITY PREPARATION

Too much emphasis cannot be laid upon the importance of correct cavity preparation. For the most part those who employ the cast gold inlay have indulged in the expedient of wide cavity cutting, and very naturally, therefore, have laid the cavity margins in the immune areas of the tooth surfaces involved. This is as it should be, and should be studiously followed in all cases and in the same manner as prescribed for the laying of margins for gold fillings; in fact, cavities properly filled with inlays should present very much the same external appearance as do the same cavities filled with a well-planned gold filling.

The cavo-surface angle may, and as a rule should, be beveled. The principle of resistance form which governs cavity preparations for gold fillings, applies also in gold inlay work, and should be carefully followed.

No retention form is employed in cavity preparation for inlay work. While this is an element of weakness, it is partly overcome by increasing the depth of the cavity preparations whenever possible, and the skillful management of the degree of wall inclinations which in all cases should be diverging.

While the term convenient form probably cannot be used in the same sense in connection with inlay work as in cavity preparation for gold filling, nevertheless the cavity formation as a whole should be such as to permit the removal of the wax filling without distortion, and of such character as will, to the greatest degree, assure accuracy in the proper seating of the inlay during the process of setting.

These observations apply in the treatment of cavity preparation for gold inlays in general.

In considering the five classes of cavities the gold inlay according to its merits and availability as a filling method seems to offer itself for use in the order named.

First—Cavities in the proximal surfaces of the bicuspids and molars.

Second—Cavities in the proximal surfaces of the incisors and cuspids which do not involve the removal and restoration of the incisal angle.

Third—Cavities in the proximal surfaces of the incisors and cuspids which do require the removal and restoration of the incisal angle.

Fourth—Cavities beginning in structural defects in the teeth, pits and fissures.

Fifth—Cavities in the gingival third—not pit cavities—of the labial, buccal or lingual surfaces of the teeth.

Its greatest use, however, is found in the filling of complex cavities of bicuspids and molars, involving the proximal and occlusal surfaces, pits and fissures.

I have referred to the gold filling as being a product of skill, and that only specialized skill of the highest order can produce a perfect gold filling. This statement, however, was not intended to imply that skill is not essential in the production of a perfect gold inlay.

Skill is necessary in both cases; in the case of the gold filling, skill is an absolute necessity. It is the only thing that will guarantee success. But an unskillfully made inlay will become more or less efficient by virtue of the cement. The first case is expressed by degree of failure and the second by degree of service.

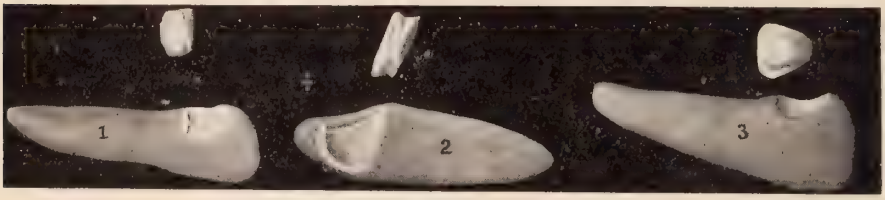
Cement, however, will fail sooner or later according as its work of retaining the inlay is increased or lessened, first by an unfavorable or favorable cavity preparation, and second by degree of marginal protection.

In order to overcome any difficulties which might be encountered in attempting the task of giving a written description of cavity preparation for gold inlays, I have prepared some models for this purpose which I hope will prove more interesting and satisfactory to your members if given as a part of my demonstration and clinic.

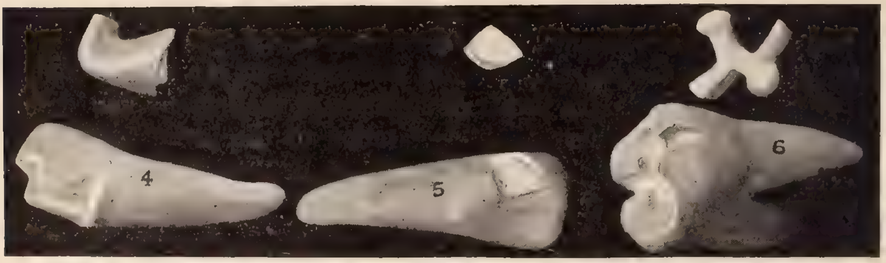
Fig. 1—A cavity prepared in the distal surface of an upper lateral incisor showing complete removal of the labial enamel wall and only a portion of the lingual wall.

Fig. 2—A cavity prepared in the mesial surface of an upper lateral incisor showing complete removal of the lingual enamel wall with entire labial wall remaining.

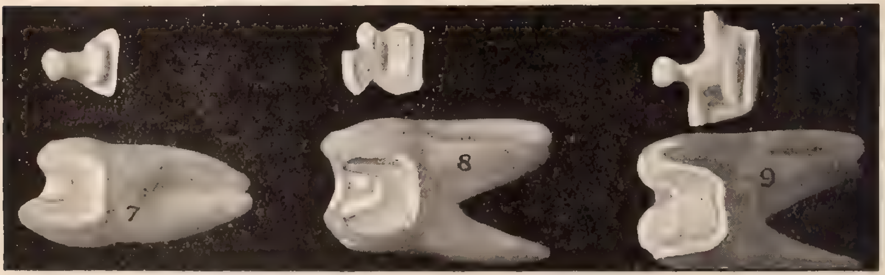
Fig. 3—A cavity prepared in distal surface of upper central incisor showing management of the labial and lingual enamel walls which have not been undermined by decay. Wide separation is necessary in this case to permit removal of wax model and the insertion of inlay.



Figs. 1, 2, 3



Figs. 4, 5, 6



Figs. 7, 8, 9

Fig. 4—This illustration is intended only to show the management of the cavity outline of a full step cavity prepared in the mesio-incisal surfaces of an upper central incisor with vital pulp.

Fig. 5—A cavity prepared in the mesial surface of an upper central incisor. This preparation is shown to illustrate the author's respect for prophylaxis and the influence this admirable treatment may exert in the curtailing of wide cavity cutting in the management of certain cases.

Fig. 6—Cavity prepared in occlusal surface of upper first molar showing extension of cavity to include pits and fissured grooves.

Fig. 7—A mesio-occlusal cavity preparation in upper first bicuspid showing partial removal of the mesio-buccal angle. This picture illustrates the management of an average case where decay has broken through marginal ridge.

Fig. 8—A disto-occlusal cavity in an upper first molar. This picture illustrates the extension of cavity cutting generally required for complete removal of decay where undermined enamel is confined to original surface.

Fig. 9—A disto-occlusal cavity in an upper first molar showing cavity preparation made necessary by backward decay undermining disto-lingual and disto-buccal cusps.

FORMATION OF WAX FILLINGS

After completing the cavity preparation, very frequently slight errors will be discovered in the process of taking the wax impression. If this should occur the cavity should be corrected in accordance with this requirement in order to permit the removal of the wax without distortion.

Slight undercuts and irregularities may exist, however, which are not sufficient in degree to offer any resistance to the removal of the wax, but are, nevertheless, sufficient to injure the accuracy of the impression by producing some degree of distortion. According to the qualities of the wax used, this may occur and escape the sense of feeling or sight of the most vigilant operator.

REGARDING PROPERTIES OF INLAY WAX

A good inlay wax should be perfectly plastic and have the quality of flowing under pressure while warm, and should also possess the property of brittle hardness when cold. Wax of this nature, by well directed pressure may be driven into all parts of the cavity while plastic, and can be depended upon to break when hard, provided any undercuts or irregularities exist which tend to prevent its free removal.

No fault can be found with brittle wax if the cavity preparation is correct. If the cavity preparation is not perfect it is better that the wax break, rather than change its form. The ordinary manner of making the wax filling or model is as follows:

TECHNIC OF MAKING WAX FILLING

Select a cone of wax perhaps four or five times the size of the cavity and place it in water of a temperature of from 135° to 140° F., to soften. This can be accomplished best by sticking the wax on the point of a pin which has been pushed through a piece of cork of about one-half inch in thickness, and two inches in diameter. Then float the cork in water of the required temperature with the wax submerged. Or first wet the cork and place the base of the wax cone in contact with it, depending upon capillary attraction to hold the wax in place, then submerge the wax as before. In four or five minutes the wax will be thoroughly softened. While this is taking place, the operator may busy himself by syringing the cavity with water of the same temperature so that the tooth will not chill the wax before it has had time to flow into every portion of the cavity. The wax should be pointed in such a manner as will permit its being readily carried to the deeper portions of the cavity. This wax then should be re-softened and forced into the cavity with a steady pressure from one direction only. This pressure should be continued until the wax is forced into every portion of the cavity. Pressure should not be exerted from two different directions unless a resultant force is desired; in this case the resultant force should be of constant direction. Imperfect results may be expected if force is exerted upon the wax from two different directions acting at different times. The pressure, therefore, should be constant and exerted from one direction only, and furthermore after pressure has been once discontinued it is not safe to again resume it.

In case the cavity involves an occlusal restoration of a considerable portion of a bicuspid or molar, the pressure should be continued until the finger tips come in contact with the tooth, whereupon the pressure is discontinued and the patient instructed to occlude the teeth, after first syringing the occlusal portion of the wax with warm water.

Fig. 10.

This latter procedure is permissible in most cases and often very desirable, but the practice of instructing patients not only to occlude their teeth but also to go through all the phases of articulation, is inviting the element of chance.

The exposed surfaces of the wax cools and hardens in advance of the interior, hence, the rocking motion of the teeth in contact with the outer surfaces of the wax, is liable to rock the entire mass.

Water present in the cavity is generally sufficient to overcome the adhesive qualities of the wax. Equal parts of glycerine and castor oil have been recommended for this purpose, and may be used to great advantage in cases of cavity preparations with deep retention pits.

In extensive cases of repairs usually associated with complex cavities involving the restoration of three or more surfaces, especially in connection with proximal surfaces where the gingival wall is located at a considerable distance beneath the gingival margin, a matrix will facilitate the more perfect insertion of the wax by confining it to the cavity and also will assist in carrying out the principle of applying force to the wax in only one direction.

When the matrix is used the occlusion should be noted before it is adjusted. This should be done as a guide to assist in the removal of the surplus wax incident to the removal of the matrix.

Frequently it is desirable to use one or more dowels to assist in the retention of gold inlays. In this case the dowel should be dipped in a saturated solution of alcohol and boracic acid. The alcohol should then be burned off, which leaves a fine deposit of the boracic acid coated over the entire dowel, after which it should be heated in a flame of the bunsen burner to fuse the deposit as suggested by Dr. Talbert.

After the wax has been finally placed it should be hardened with cold water and given the required external shape by carving. The art of carving the wax filling to its correct form is usually a very difficult operation and should always be done with painstaking care. Special instruments designed to meet the requirements are used for this work. Probably no special plan of procedure need be formulated for this work, but in a general way in proximal cavities which involve the occlusal surfaces of the bicuspids and molars, the occlusal surface should be finished first; second, the buccal and lingual; third, the gingival portion; and lastly that portion which includes the approximal contact. In simple smooth surface and pit and fissure cavities, the order should be followed which seems to be the most advantageous. The surplus wax should be sliced or cut away in thin pieces and the final shape and contour effected by holding the carving instrument at such an angle with the wax surface that it will remove the wax by scraping or shaving.

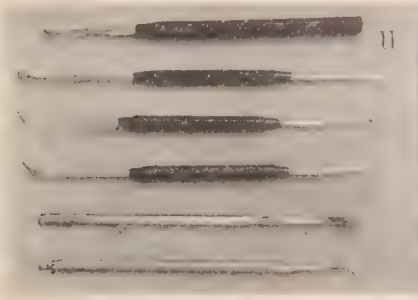


Fig. 11

Fig. 12

As a rule in trimming the wax flush with the cavity margins the instrument should be held in contact with the margin and tangent to its circle of curvature, and the stress of carving should always be applied in a direction towards the cavity and cavity margins.

The final finishing of the wax surface can be imparted by burnishing with a hard-rolled pellet of cotton moistened with oil of cajeput or water. After the wax is completed it should again be hardened with cold water, and is then ready for removal. This may be accomplished first by means of the sprue, or second, by the use of any sharp pointed instrument such as an ordinary exploring point. The former method, however, seems to offer greater possibilities of exercising more perfect control in the operation than in the latter. Having removed the wax, it should be washed in a cold solution of soap and water to remove all traces of saliva and then thoroughly chilled in ice water, mounted upon the crucible former and invested immediately.

INVESTMENT

No procedure in the entire method of gold inlay work is more exacting than the management of the investment. First, the investment should be mixed according to a proven plan, the water and investment compound should be used in definite proportions, generally by weight. They should be carefully mixed in a manner that assures the complete expulsion of air.

The former requirement can be best observed by using the measuring or weighing device supplied by Dr. Taggart, and the latter operation is greatly facilitated by using an extremely fluid investment such as has recently been supplied also by Dr. Taggart.

The fluidity of this investment is not only a distinct advantage, but in addition to this it possesses the property of setting slowly. In using this investment mentioned therefore, the element of hurry is eliminated and the process of investing the wax filling may be carried on with a greater degree of deliberation than is the case with a thick investment possessing the property of fast setting.

Great care should also characterize the process of applying the investment to the wax filling. With the fluid investment it may be poured upon the wax, but generally it can be applied with more accuracy by carefully painting it upon the wax by the use of a small sable or camel's hair brush, and lastly by pouring the remaining quantity upon the first until the flask is completely filled.

After the case is invested it should then be set aside until fully hardened, whereupon the base or crucible former may be removed after first being slightly heated and the sprue wire removed by grasping the projecting end with hot pliers, and then effecting its removal after the attachment of the wax to the sprue has been released by conducted heat.

The next step of importance in the management of the investment is the complete elimination of the wax, preparatory to the casting process. This marks the second stage in the treating of the management of the investment, and is of equal importance with the first.

The flask should be supported over a bunsen burner, and the flame properly regulated, and progressively increased for the purpose of first, drying the investment; second, dissipating the wax by melting and absorption; third, burning out the wax that has been melted and absorbed by the investment; and fourth, the complete combustion of the residual product formed by the burned wax including the gases which are formed in the operation.

The degrees of heat that the flask is subjected to during this process varies from less than 212° F. to 700° F.

Incipient red heat is manifested at about 1,000° F., therefore, to heat the flask to redness is not necessary.

This process of burning out the wax and the gases should extend over a period of about one hour. After the flask has been thus treated it should be permitted to cool.

The next operation is that of casting which will be considered without taking the machine or casting appliance into consideration.

CASTING

The inlay should be cast of 24k gold for ordinary cases. Whenever the stress of occlusion demands a metal of greater strength, or attrition requires a metal with the property of hardness in a degree not possessed by pure gold, then five or ten per cent. of platinum should be alloyed with it.

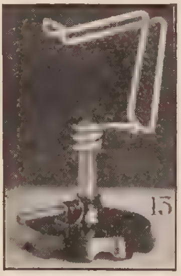


Fig. 13

The quantity of gold employed should be greatly in excess of the amount actually required, about five times as much in small cases and at least two times the required amount in large cases. A mixture of nitrous oxid and illuminating gas used in the nitrous oxid blow pipe furnishes the most suitable means of properly melting the gold for casting. The metal should be heated until white hot and immediately cast while it is in this extremely fluid condition.

I am convinced that the shrinkage of gold or the management of its shrinkage as commonly understood and applied to inlay work, is not of so much importance as is the management of the property of spheroiding.

This property is possessed by metals in the fluid state as is evinced by the molten gold, which refuses to run into the mold. However, as soon as pressure is applied, this property is overcome and it is forced in the mold and so held. but on congealing, this pressure is automatically cut off and its property of spheroiding again manifests itself in its power to control the direction of shrinkage.

To illustrate: A given mass of gold, when melted, will assume a globular form of certain dimensions which we will call its spheroid dimension. Now, when this mass is compelled to change this form upon being forced into an irregular mould under pressure, it still retains this power to spheroid, and manifests itself during the process of congealing—so that part of the irregular mass which lies outside of its spheroid dimension is drawn to the center more than can be accounted for by the element of shrinkage alone, and that part of the irregular mass which lies inside its spheroid dimension either increases, remains constant, or decreases according as the distance from the spheroid dimension is increased or decreased and its power to spheroid predominates over its power to shrink. In other words, in the first case the power to shrink and the power to spheroid are being exerted in the same directions and work together; in the second case they work in opposite directions and are antagonistic to each other.

When a hot investment is used the surplus gold cools or congeals first, while in case of a cold investment the surplus gold congeals last.

In the former case the congealed surplus shuts off the pressure from without and the gold within is left to the mercy of its power to spheroid, while in the latter case the gold within congeals first while the pressure from without is still being exerted and the power of the gold to spheroid is minimized if not entirely overcome.

Shrinkage alone does not account for the decided deficiency in that portion of an inlay which is the most remote from its center, neither does it account for an overly snug fit in that portion of the inlay which lies closest to its center, but shrinkage plus the deformation wrought by its power to spheroid will account for the former, and the deformation resulting from its power to spheroid minus shrinkage will account for the latter. Hence it seems obvious that an inlay cast in a cold mould will meet the requirement better than one cast in a hot mould.

After the inlay has been cast it should be permitted to cool, then removed from the flask and freed from its investment, the sprue cut off and then it should be placed in equal parts of hydrofluoric acid and water from four to five minutes until all traces of investment material have been removed.

The surplus gold also should be treated likewise; in fact if the acid is contained in a suitable receptacle for this purpose the casting gold may be kept indefinitely in this mixture, ready for instant use by simply removing and washing. After the inlay has been treated with acid, it should be thoroughly washed and scrubbed with a brush in water, dried and examined through a magnifying glass for any imperfections.

Frequently nodules of gold will be found attached to the cavity surface of the inlay. Some of these may be so small in size as to entirely escape notice unless detected by the aid of a magnifying glass. These, when present, should be completely removed with a sharp cutting instrument of convenient form, before any attempt is made to prove the inlay by trying in.

Apart from the occurrence of nodules, which are the result of carelessness and improperly mixed and applied investment, no alterations should be necessary.

The possibilities of the casting method are perfect for the production of inlays which are perfect. When inlays are produced which have to be altered materially before properly going to place or have to run the gauntlet of the cutting, grinding, fitting, hammering and trying-in process, it is evident that there is something wrong somewhere. It is better to start all over again rather than go ahead and put too much trust in cement.

METHOD OF MAKING A HOOD ATTACHMENT FOR SWINGING IN AN ANTERIOR CROWN*

BY DR. THOS. P. HINMAN, ATLANTA, GA.

First the distal surface of, for instance, a cuspid, is prepared by cutting a shallow cavity reaching distally rather than mesially, this cavity being perhaps two or three lines across. A square-edged carborundum wheel, about a quarter of an inch in diameter, is used to square the upper border. Three pits are drilled with extreme care to avoid proximity to the pulp, parallel with each other, one at the base of the prepared cavity, and one on each side, mesially and distally. Pure gold, the three thousandths of an inch thick, is now burnished upon the floor of the cavity. Through this are thrust iridio-platinum pins, which later are soldered to the plate.

This is designed for swinging in a single tooth, or may be employed to support one end of a bridge. The further end of the bridge presupposes a mesial cavity, in the base of which are drilled pits for receiving pins. Emphasis is laid on the fact that pits so located serve the purpose of supporting a bridge better than any attachment made on the occlusal surface, or in other words, nearer the end of the tooth having a wider range of movement.

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*Clinic Northern Ohio Dental Society, 1913.

Seventy Years in Practice

The following letter is self explanatory of a remarkable man and a remarkable record:

DEAR DR. BETHEL:

In January I enter my seventieth year of practice, and nearly my eighty-eighth year of age, and can accomplish as much in a day as ever, for the machine is still in good working order. In other words, the old craft is still afloat, timbers sound, no leakage, engines all right, and no prospect of going into dry dock for repair.

Truly and fraternally,

LOOMIS P. HASKELL,
Chicago, Ill.

PRESENT-DAY POSSIBILITIES AS APPLIED TO CROWN AND BRIDGE WORK*

BY HART J. GOSLEE, B.S., D.D.S., CHICAGO, ILL.

THE MESSAGE WHICH I HAVE THE HONOR to bring to you today does not teem with new or original thoughts, nor yet does it deal at all with abstract problems or theories. So much has been written upon the subject of casting as applied to the construction of crown and bridge work during the past five years that it would be difficult, I think, for most anyone to bring to you much which might be called absolutely new. My ambition, therefore, shall be directed more toward again giving emphasis to certain lines and methods of procedure in the concrete rather than to presume to offer anything of a startlingly original character; to urge you to adopt and perfect present methods rather than to look to and hope for new ones; and to impress upon you the extent to which my own methods and practice have been revolutionized during this period. This has been so marked, and my results have been so much better, that former chaos and empiricism have been forced to give place to system and order and method in my practice, the whole resulting in a degree of systematic procedure which offers and insures more or less definite results.

Since it is *results* which we seek for, after all, and since the application of casting together with other contributory improvements make it possible to more perfectly systematize our work and to obtain results heretofore impossible, it is essentially my purpose at this time to call attention to present-day possibilities, what they have meant to me, and what they may mean to you, and to present to you in crystallized form the experience of a number of years; the practical side of crown and bridge work shorn of any garlands of theory.

As I look back over the methods of the past and compare them with those of the present; as I think of the empiricism which tinctured our procedures then, and of the simplicity and practicability of our methods of today, and as I recall the results obtained then and observe those which are now possible, I am grateful for having practiced dentistry in this era, and I bow with reverence to those who have made such improvement possible. I am not only grateful from the viewpoint of the dentist, but also for the one who, though innocently, yet properly, profits most—the patient.

Whilst the epoch of "painless dentistry" has not yet been reached—excepting in the abortive claims of the charlatan—still the advent and the skillful application of casting have done more to lighten the burdens of the patient, and to diminish the discomfort usually attending dental operations of any character than any other effort, and this to an extent which will cause the proverbial and axiomatic dread of the dental chair to occupy no place in the minds of future generations, unless it be only as an historical reminder of the dark age of dentistry.

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*Read before the Kentucky State Dental Society, 1913.

And yet, with all of the beneficent importance which may be attached to this phase of the application of casting, it still remains that the greatest value lies in the fact that better adaptation and greater strength in our work is made possible and easier. and that these two primary prerequisites are absolutely essential to any class of work which must withstand the varying requirements of masticatory stress and also meet the demands of modern cosmetics.

Modern cosmetics as applied to dentistry means the art with which the artificial may be concealed. The advent of porcelain has made it possible to so closely simulate the natural teeth as to conceal the artificial, but unfortunately porcelain does not possess the inherent element of integral strength which is demanded by average masticatory requirements. Many of us learned this from sad experience in the early wave of enthusiasm which accompanied the introduction of porcelain crown and bridge work of a certain type.

This experience taught us that to obtain the advantages of porcelain it must be used in its strongest possible form, and even then that it must be adequately supported and protected by the metal sub-structure.

The degree of accuracy and facility with which the required adaptation may be effected, together with the possibilities for obtaining adequate strength and desired form offered by the casting process, now enable us to use more porcelain and less metal than we formerly could do with safety, thereby subscribing to the cosmetic requirements to a high degree, without sacrificing either of the other requirements of adaptation and strength to any appreciable degree.

Always believing that the strongest possible form of porcelain tooth would be one in which no metal pins were baked, and that increased strength would obtain from cementing the tooth to the basic structure instead of subjecting it to the heat of soldering, or even of casting to it, I have been able to induce the manufacturers to make the tooth which is now known by my name and the introduction and application of this form of tooth, combined with the casting process, and used with good judgment and careful technic, has so completely revolutionized and simplified my methods as to enable me to obtain results heretofore impossible, and to cause me to offer you the procedures which now constitute my methods of practice.

I have purposely emphasized the belief that a porcelain tooth or facing which has no metal pin or pins baked in it is stronger than one which has, and also that one *cemented* to place is stronger and less likely to become fractured than one which has been soldered, or one which has been subjected to the heat of casting. I also want to especially emphasize that casting directly to porcelain teeth of any form is fraught with danger and uncertainty, and that no possible advantage over the tooth which is cemented to place, providing its supporting base is well adapted, is to be thus obtained.

In addition to the greater strength obtaining in the tooth cemented to its base we also have the advantage of replacement, which is of paramount importance.

The methods which I now use are so few and simple, and the results are so satisfactory, when compared with our previous efforts, that I am ambitious to aid all who may be interested. To this end, permit me to briefly epitomize the suggestions which I have previously made from time to time, and the procedures which I now follow.

SINGLE CROWNS

For all teeth within the range of vision, where porcelain is demanded, the porcelain replaceable or interchangeable crown, *with cast base,* and with a narrow band, is used wherever possible, and this constitutes a very large percentage of cases. Notwithstanding the almost daily controversy which the question of bands on dowel crowns brings forth, the frequent occurrence of fractured roots has caused me to have made an invariable practice of using a narrow band on all cases, and no sane objection can be offered to the use of a band—*providing it fits.* In my opinion, inability to properly fit a band constitutes the only real good reason for condemning its use, excepting in those cases of extensive recession of gum tissue and process, or in cases where pathologic conditions or the age of the patient warrants only more or less temporary efforts on our part. This type of crown is undoubtedly the strongest, most artistic, and most universally applicable substitute for the natural tooth at our command, and in all respects is excelled only by a skillfully adapted "jacket" crown. Indeed, for the average dentist it is better and possesses an advantage over the latter in that immediate replacement in the event of mishap is possible.

In the construction of all forms of porcelain crowns with cast bases much difficulty has been and is now being encountered in moulding the wax to a close adaptation to both the root-end, *particularly at the periphery,* and the base of the crown, and at the same time have it hold the dowel or dowels in the proper position to insure correct alignment.

These essential features are usually so difficult and so unsatisfactory as to have caused me to adopt and suggest a technic which eliminates any uncertainty, which insures accuracy, which is applicable alike to all cases, whether a band is required or not, which makes the fitting of a crown to the most difficult root as simple as to the easy one, which relieves the patient of any discomfort whatever, and which, when used in connection with the type of tooth mentioned, has proven the most satisfactory method of crown construction I have ever followed.

In the various methods now generally used and advocated, good, accurate results are difficult to obtain, because the very plasticity of wax makes it possess a tendency to *spread* when subjected to the pressure necessary to mold it to a clean, close adaptation.

This tendency has made it practically impossible for me to obtain a satisfactory degree of accuracy of adaptation to the root-end. However, such difficulty may be entirely overcome, and absolute accuracy obtained in all cases by first adapting a cap of *thin* pure gold (about 36-gauge) to the root-end. If this is carefully done, the surface thus obtained will always be a closer fit to the root than can possibly result from the moulding of wax to it, with any investment material now procurable, and this surface will require no finishing whatever after casting, and the crown will readily snap to position on the root when finished.

Also, such a procedure reduces to a minimum the possibility of any change of form which may result from the warpage or shrinkage of the gold or alloy used in casting, and this is a very important consideration.

While the adaptation of the cap may be effected by burnishing directly to the root, in the mouth, the best, most accurate and least painful results are always to be obtained by *swaging*. This necessarily involves the impression and die, *or indirect,* method.

In cases where the space between the cap and the base of the crown is very small, or where it may not be convenient or seem necessary to cast the base, good results may be obtained by soldering instead of casting.

In such cases the porcelain tooth also should always be backed up with 36-gauge pure gold by burnishing or swaging; the crown and backing then placed in position in relation to the cap, the porcelain removed, the case invested, and the space between cap and backing then filled with 22- or 20-karat solder.

This method is particularly useful in very short bicuspids, but where there is sufficient space to permit of casting, the results thus obtained are perhaps more uniformly strong.

This procedure reduces crown construction to a definite system; a system which requires but little time, which is simple, and which insures a more or less perfectly adapted base, obtained without any of the usual discomfort to the patient. This latter feature is rarely possible when *burnishing* directly to the root-end is attempted.

The construction of a crown by this method involves but three short sittings, and the best results are to be obtained by doing all the work directly in the mouth.

At the first sitting the root is prepared, the root impression taken, the mold number and color selected, and a temporary crown mounted. This latter feature is desirable as a means of packing the soft tissues away to afford and insure a free exposure of the root-end at the next sitting, as well as to relieve the patient of the temporary embarrassment. The amalgam die having been made and the pure gold disc swaged and tooth selected *in the meantime,* at the second sitting the cap is fitted to the root, the dowel and tooth adjusted to the requirements, the dowel then soldered to the cap, and the relation between the tooth and cap secured with casting wax. The crown is then cast, the tooth cemented to place and finished, and the final mounting is made at the third sitting.

In cases of molars, upper first bicuspids, and malposed teeth, where one dowel will not enter the canal and at the same time sustain the tooth in its proper alignment, a separate short dowel must be used for the tooth in addition to the one which enters the canal, and each should be allowed to remain as long as possible to permit of the proper adjustment of the tooth, and insure strength. In upper first bicuspids, if the dowel is placed in the *buccal* instead of the lingual canal, the adjustment will usually be facilitated.

While there is no objection to backing up each tooth, in addition to swaging the root cap, and filling in between them by casting, it is not usually necessary. Such a procedure offers the advantage of insuring the ready adjustment of the porcelain tooth to its metal base, but at the same time it holds the tooth just that much farther away from the root, which may result in the display of a line of gold in the completed crown.

GOLD CROWNS

For second and third molars—and even first molars, when the presence of gold is not objectionable—the cast gold crown affords results far in advance of anything heretofore obtained. In the construction of gold crowns by the casting process, however, the fit or peripheral adaptation is, because of the spreading tendency of wax, *always best obtained by* previously fitting some form of band to the root and then casting directly to it.

When an exaggerated contour is not required, and it seldom is, the band may be made of 28-gauge, 22-karat gold, and fitted and contoured in the usual manner. When in position on the root, casting wax is then molded to the end of the root inside of the band, and this procedure followed by an imprint in the wax of the opposing teeth in all of the movements of mastication.

After the band has been removed, its interior should be filled at once with casting investment material, and the occlusal surface properly carved, after which it may be invested and cast, using for the casting the same grade of gold of which the band was made.

If the band is thoroughly clean before investing and the gold to be cast is of good quality and highly fused before casting, a physical union will probably obtain, but if it does not, a small bit of 22-karat solder placed inside will insure the same.

A thin disc of platinum foil placed inside of the band and over the end of the root just previous to molding the wax will insure a smoother surface, and therefore a better seating of the finished crown after casting, than is to be obtained from investment material alone.

Where the root is very short, and the occlusal surface would therefore be unnecessarily thick, resulting in a finished crown which would be much too heavy, any surplus of wax may be removed by using a large round bur in the engine, or the Roach suction carver, just previous to filling the interior of the band with investment material.

Where an exaggerated contour is desired, the best results are probably to be obtained by first closely fitting a platinum band, about 32-gauge, to the root, trimming this even with its occlusal plane, and then soldering a top to it, thus completely boxing up the end of the root with a close-fitting platinum cap. An impression and bite may then be taken and when the models are obtained all of the form and contour desired may be made with wax, and the casting made directly to the platinum cap.

These two general types of porcelain and gold crowns will meet the requirements of single crown work in a very large majority of cases, and the results are far more accurate than are to be obtained by any of our former methods.

FIXED BRIDGE WORK

In fixed bridge work, which constitutes an assemblage of attachments and intermediate dummies, our work may also be simplified, because three general types of attachments and three general types of dummies will be found to meet the requirements in an exceedingly large percentage of cases.

ATTACHMENTS

The methods of obtaining attachment to the supporting teeth or roots embrace the *porcelain replaceable crown* with dowel and *cast base,* the construction of which has just been described, as applied to the *roots* of anterior teeth, or when it is impossible or seems inadvisable to preserve the natural crown; the *inlay,* when the attachment is to be made to the *crown* of a natural tooth, which is good practice only when the remaining natural crown is sufficiently strong; and the *gold crown* for the molar teeth when the use of an inlay is for any reason not indicated.

When an inlay is to serve as an attachment, the cavity preparation is, of course, exceedingly important, and some form of post or posts should always be used to insure stability and as a provision against the inlay becoming loosened by the strain and possible torsion to which it is to be subjected.

The general applicability of the inlay as an attachment for bridge work has been a subject of considerable discussion ever since casting became an accepted practice. That it will serve the purpose as well as, and in some respects even better than, a full crown there can be no doubt, providing its adaptation and stability are insured.

The former depends, first, upon adequate and proper cavity preparation, and then careful technic in making the inlay; and the latter depends upon the use of a proper alloy in casting and upon pins or posts of some form, for the reasons mentioned.

Wherever the walls of the supporting tooth are sufficiently strong to insure permanency; whenever a suitable cavity may be properly prepared, the inlay, well-seated and securely anchored, and made of a hard alloy, such as five per cent. platinum in pure gold, coin gold or 22-karat gold, I am of the impression that such an attachment may sometimes be even better than a full crown because less mutilation of the tooth is required, and no possibility of gingival irritation is afforded.

The cavity preparation for inlays to be used for the purpose of anchorage does not differ essentially from that for a simple filling, excepting that the *buccal, lingual and cervical* margins must be so extended as to carry the margin between tooth and filling beyond any actual contact of the artificial tooth to be supported by it, in order that each and all of these margins may be exposed, for hygienic reasons.

The possibilities for obtaining a good close adaptation of the inlay to the cavity margins, and thus insure permanency in the attachment to the natural tooth, are such as to relegate the open-face crown, the "hood" and so-called Carmichael attachments, etc., to the archives of the past.

DUMMIES

As dummies for bridge work, three general types will answer the requirements in all cases:

The all-porcelain replaceable crown and bridge tooth with cast or otherwise well re-enforced backing is adapted to all positions in the arch where the conditions of absorption and occlusion will permit their use, and is undoubtedly the ideal form of artificial substitute. Backings for these teeth may be made in sections involving the number of dummies between the attachments, which should never exceed three, or possibly four, but better form, larger and therefore more hygienic interproximal spaces and less display of gold, are to be obtained by *making each backing separately*.

As a means of preserving the proper relation of the short sustaining post which holds the tooth to the backing, and of insuring a smoother surface adaptation of the backing to the porcelain than the ordinary casting investment materials afford, in using this type of "dummy" a thin backing of about 38-gauge, pure gold, should be previously swaged or burnished to the tooth, and the post soldered to it. It is then always necessary to allow as much surplus end of post as possible to extend beyond, in order to insure strength in the final attachment of this essential part to the completed backing.

Casting wax may then be molded to the required form, and the casting made directly upon and against the thin gold backing, by which method any distortion or possible misfit due to shrinkage or warpage is overcome, and the most finished, accurate and reliable results are insured.

In the use of this type of tooth in all cases in the upper arch where complete absorption has already taken place, the most sanitary form of structure is usually to be obtained by molding the wax so as to restore or approximately follow the lingual form of the tooth, but tapering down to a narrow saddle at the point of contact with the soft tissue. As a rule, and contrary to the opinions of some, however, wherever the adaptation is good, such a type of construction will be found to be far more sanitary than the usual recesses, shelves and pockets so common in the ordinary methods.

In this more or less typical fixture it will be observed that practically no gold is displayed anterior to the second molar, and yet that a maximum of strength presents throughout.

In cases where complete absorption has not occurred, a saddle is, of course, contraindicated, but in these cases the neck of the porcelain tooth should accurately fit and bear *firmly* upon the soft tissue, and the lingual surface of the backing should then be so formed as to be as nearly convex or self-cleansing as possible.

For those cases in the anterior region where abnormalities of occlusion or elongation of the opposing natural teeth demand a *thin facing,* the ordinary type of long pin facing may be used. In its use, however, the best results are to be obtained by previously backing it up with thin pure gold, adding wax to this to the desired form, removing the facing, placing graphite points in the holes which receive the pins, and casting. The pins may then be threaded with the Bryant tap and, when the backings have been assembled with solder, the facings may be cemented to position, thus obtaining all of the previously mentioned advantages of cementation, combined with better form and more uniform strength.

In addition to these, for those cases particularly in the lower arch, and in exceedingly ''close-bites,'' where cosmetics is not a factor, or where the extent of absorption or the elongation of opposing teeth precludes the use of porcelain in any form, the all-gold, cast dummy may be used. Such dummies may be made to conform to the requirements of occlusion, adaptation to gum—if such is required—and contact with the attachments, in wax, and then invested and cast in one piece. This type of ''dummy'' is useful in supplying the lower second bicuspids and first and second molars, and may include only the occlusal surface, thus forming the so-called ''self-cleansing'' type of bridge, or the entire tooth with or without a saddle, as the requirements may be. The former type of construction is indicated only where there is an excesssive degree of absorption, which will permit of sufficient space between the gum and occlusal surface to insure self-cleansing properties, and wherever this space is not great enough *to be easily kept clean,* direct contact with the gum will afford a more hygienic result. In other words, there should be plenty of space, or none at all.

With these, the problem of attachments and of intermediate dummies for almost universal application is simplified and systematized.

The remaining feature incident to the construction of all forms of fixed bridge work involves only the proper assemblage of the various parts. While some are casting all attachments and backings with an alloy of five per cent. of platinum and pure gold, thus using no ''solder'' whatever, still a good grade of 22-karat gold or coin gold may be used with equally good results. When either of the latter is used, the final assemblage may be effected with 22-karat solder, *and providing there is absolute contact* *between all of the parts to be united* the procedure is thus somewhat facilitated, and the results are uniformly good.

REMOVABLE BRIDGE WORK

The same general ideas are also applicable to the construction of removable fixtures.

For this class of work, also, three general types of anchorage to the supporting teeth or roots will be found to adequately meet the requirements of the average case. These embrace "clasps," the "telescoping tube and split post," and the various forms of manufactured attachments.

Wide clasps encompassing three angles of the tooth, provided with an occlusal rest, not cast, but made of heavy rolled clasp-metal alloy, probably afford the very best means of obtaining anchorage to the natural or artificial crowns of bicuspids and molars.

That clasps should not be cast is especially emphasized, because the molecular rearrangement resulting from casting most of our present alloys destroys to a greater or less extent the very qualities of strength and resilience demanded of them, and which undoubtedly obtain best in a *rolled* or *drawn* metal or alloy.

In all forms of removable bridge work or partial dentures, where clasps are used, however, some form of occlusal rest is necessary as a means of providing against subsequent settlement of the case. If this precaution is not observed, complete loss of occlusion and usefulness will soon follow.

The telescoping tube and split post attachment is useful when confined to the *roots of the six anterior teeth*.

The Roach, Morgan and other types of manufactured attachments will also be found valuable when used in connection with either porcelain or gold crowns or inlays on the cuspids and bicuspids, and the Morgan attachment is particularly useful on cuspids and bicuspids where no tooth posterior to the one carrying the attachment remains.

In addition to these, I call your attention also to a most useful method of attachment which is more or less universally applicable, the one now known as Gilmore's.

This consists in utilizing the grasping principle of an open tube with straight and parallel sides, which is the removable part of the fixture, in combination with a round wire, of about 12-gauge, attached to and therefore a part of the "fixed" portion of the structure, but lying in a horizontal position instead of in a vertical one, in its relation to the supporting fixture.

It is easily applied, easily tightened when loosened by wear, takes up but little space, does not require absolute parallelism when more than one is used on the same fixture, and is applicable alike to either gold or vulcanite work.

When the type or types of attachment thought to be best indicated have been selected, adapted, and completed, the casting process then offers splendid opportunity and great possibilities for the subsequent formation of the body of the fixture, and in this connection I believe that the successful casting of large pieces or of bases of any size, is but a question of the development of proper technic on our part.

CARE OF BRIDGE WORK

The proper care of dental bridge work is often and indeed usually wantonly neglected by the patient. The dentist, however, is largely responsible for failure to observe the same degree of hygiene in mouths in which either fixed or removable structures are worn, that is and should be observed in the mouths of those who are so fortunate as to possess a full complement of good natural teeth. To this end the dentist should properly instruct the patient as to the necessity for and best means of keeping the mouth and the work in a thoroughly sanitary condition, as an invariable practice and a religious duty.

100 State St.

INDIRECT INLAY SYSTEM*

BY DR. H. W. GILLETT, NEW YORK, N. Y.

For saving time for operator and patient and enabling the strictly mechanical parts to be done at the laboratory bench, this method is recommended:

Impression in Perfection Impression Material, in which amalgam die is made, bite in wax into which die is placed, the plaster casts when made to be mounted in small articulator.

Impression material should be confined and kept under pressure while taking impression and cooled with compressed air current or cold water, so reducing the error from shrinkage.

This provides opportunity for convenient carving in cusp, sulcus and contour restoration; enables the retrieving of any erros in the casting process without going back to the patient, and provides an accurate duplicate of the cavity in which to finish the inlay and adjust the margins in case of distortion or shrinkage of the gold.

Restoration of fractured molar roots by a modification of the "Roach method."

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*Clinic at Northern Ohio Dental Society, 1913.

HOW TO OBTAIN DISTILLED WATER

BY W. BUZZELL, PORT CLINTON, OHIO

Distilled water for hypodermic solutions and other purposes may be obtained by allowing steam from the spout of a teakettle to issue against the clean surface of a tin pail kept full of cold water. The steam will condense on the cold surface and may be caught in a glass placed beneath.

TECHNIC OF CASTING*

BY THOS. P. HINMAN, D.D.S., ATLANTA, GA.

PROFESSOR OPERATIVE DENTISTRY AND ORAL SURGERY, ATLANTA DENTAL COLLEGE

EVER SINCE CASTING HAS COME into vogue and the adoption of the cast filling has become so general, every conscientious dentist has been endeavoring to secure a technic that would ensure a perfect cast every time.

Some have felt after repeated failures that this is well-nigh impossible and have to some extent, at least, abandoned this valuable method. Then too, I am sorry to say, the careless have been cementing in casts that are far from perfect or even passably good, and these tend to bring the method into disrepute.

I fear that a good many have adopted a technic that is entirely impirical and have never stopped to study the cause of their failures—such as distortion, failure of inlay to seat, roughness of surface, nodules on the inlay, etc.

CAVITY PREPARATION

Before I go into the discussion of the technic of casting, I want to pause a moment to enter my protest against the slovenly manner in which cavities are prepared for gold inlays, and at the same time, warn the young operators that there are many cavities which should be filled with cohesive or non-cohesive gold or a combination of both, that will give the patient better service than if these teeth are filled with inlays. I refer particularly to the small cavities in the proximal surfaces of the incisors and the fissure cavities in the bicuspids. I have recently seen a great many attempts to inlay cavities of this description and have yet to see a reasonably satisfactory inlay placed in these positions. There is one rule in cavity preparation that has been frequently overlooked, which is, that inlays cannot be held in position by the cement alone and expect service from the filling. I refer particularly to cavities in the proximo-occlusal surfaces of the bicuspids and molars. The principle of proper extension of these cavities has so frequently been overlooked, I deem it wise at this time to emphasize the great necessity for extending cavities to immune areas and also to call attention to the necessity of the proper restoration of the point of proximal contact. So frequently the point of proximal contact is placed too far buccally and the lingual embrasure is not sufficient to allow a proper passage of the food during the process of mastication. This will inevitably cause an irritation of the septal gum tissue of the buccal side. Remember the old principle that I have advocated for so many years and still believe that "the finished inlay without cementation should be so anchored that it cannot be dislodged by the forces of mastication."

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*Read before the Kentucky State Dental Society, 1913.

WAXES

In the early days of casting when it was impossible to secure satisfactory waxes, I made a great many experiments in attempting to produce a satisfactory wax combination for use in inlay work. During the course of these experiments I found many interesting things about waxes and their peculiarities. I experimented with every wax obtainable and in all the different combinations which I could produce. The best combination I was able to secure which gave excellent results, was made by melting white wax or bleached bees-wax, paraffin and stearin, the wax giving the plasticity, the paraffin firmness and the stearin carving qualities. To this was added the stain or color in an alcoholic solution. After melting these materials together, I found that the product required annealing. This was accomplished by gradual cooling in water. After annealation I found a very much better working quality in the finished material.

From experiments that I have made I believe that the most satisfactory waxes now on the market contain the foregoing materials.

All waxes expand perceptibly when heated and shrink while cooling, but this is so slight in the bulk that is used for an ordinary matrix, that it is almost nil, provided the wax is one of the standard varieties which are found on the market.

A wax that is suitable for inlay work is not easily manipulated but requires great care in heating and handling. It must be heated evenly and not raised to too high a temperature, as this will produce a granulation or a separation of the components of the wax and utterly ruin its working qualities. If not hot enough it will crack and refuse to be forced into the cavity. Too rapid heating of the wax is to be avoided as this destroys its working qualities, giving a hard center and a soft surface. Waxes work with uniform smoothness when they are manipulated at the right temperature. I will show you here a device which I use in my laboratory which keeps the wax at a uniform temperature. 136° F. is the temperature at which the wax I use works best. It has been found that if wax is placed in a heating device and allowed to remain for a considerable length of time so as to become thoroughly heated and tempered, as it were, that it works very much smoother and easier than if it is heated rapidly and used immediately. Therefore, this device that I am showing you will give excellent service, as you can put the wax in the water the first thing in the morning and whenever you have need of a piece, it will be in perfect condition for use. I advise against heating the wax over night, because it has a tendency to bleach out the color.

INVESTMENTS

All investments are largely composed of plaster of paris and unless we understand some of the peculiarities of this material under working conditions, we are not apt to get uniform results. To the plaster is added powdered silex and in some instances graphite. These materials tend to greatly reduce the strength of the plaster and produce a rotten investment. Therefore, it is unwise to use excessive pressure in casting because it is liable to distort the mold. If we expect to obtain uniform results in producing a satisfactory investment, we should first ascertain the exact amount of water and investing material that gives the strongest and most perfect mix, and then by mechanical device, attempt to reproduce this same combination each time; that is, the investment material and the water must always be either weighed or measured before mixing. If this is carefully done, we should be able to produce the same results each time, insofar as the investment is concerned. Devices for this purpose are on the market. After the matrix has been formed and we are ready to make the investment, the following technic has been found satisfactory.

After carefully weighing the water and investment are placed in a large rubber bowl. This bowl should be large enough to hold a quart of water; however, only enough material for one investment is mixed at a time. It has been supposed for a long while it was the air of the investment that produced the nodules on the surface of our inlays, but this air does not come entirely from the bubbles produced in mixing, but are caused by the gases that form during the reaction caused by the mixing of the plaster and the water. It is only with the utmost care that you can rid the investment of these gaseous bubbles. The mixed investment should be thin enough to run around the bowl as it is rotated in the hands. Every few seconds strike the bowl against some solid object so as to burst the bubbles as they come to the surface. This should be done for at least two minutes, as it has been found that after two minutes' careful rolling and jarring, the investment is, as a rule, free of bubbles.

The matrix having been placed on the sprue-wire and crucible former, the wax is carefully painted with top surface of the mixed investment, using a very small camel's hair brush for this purpose. This, as you know, contains a larger percentage of the graphite than the balance of the mixture. When the matrix has been thoroughly covered, the sprue-wire is struck several sharp blows with a steel instrument so as to burst any bubbles which might remain on the surface. The investment cup is then placed in position and the balance of the investment poured into place. To accomplish this, you must have an investing material that sets very slowly. After twenty minutes' time, the case is ready for heating. Care should be taken to always heat the sprue-wire sufficiently so as to soften the wax at the point at which it is attached; otherwise, it is possible to distort the investment by moving the matrix if it is too firmly attached to the sprue-wire.

DRYING OUT

Drying out the investment is a very important step in the process of casting and is the stumbling block on which a great many of us have made some of our failures. It has been found that various changes take place in plaster during its hardening process, but these can be stopped if heat is applied and the water of crystalization is driven off before they take place. These changes in the form of the plaster do not begin to take place until one hour after it has been mixed, therefore, the drying out should begin before the expiration of the first hour after investment. The flask containing the investment should always be set upright, i. e., with the sprue-wire in a vertical position. The flask should never be laid on its side or upside down to allow the wax to flow out, as this tends to give a roughened surface on the finished inlay. The heat should be applied so gradually and the temperature raised so slowly that there will be no boiling of the wax and the wax will be gradually absorbed by the investment. About twenty minutes should be consumed in burning out the wax, but the flask should never be heated to redness. After heating, the flask should be allowed to cool so that the expansion caused by the heat will be reduced and we will have a mold of the same size as the wax matrix. If it is desirable to burn out one day and cast the next, it is perfectly permissible, but no investment should be allowed to remain over night without the wax being burned out.

CASTING

If the foregoing technic has been carefully followed out you may reasonably expect perfect results, provided care is used in the final process of melting and casting the gold. The gold should always be in a nugget before being placed in the crucible and should be cleansed by proper pickling. The gold should be heated rapidly and at the proper moment the cast made, however, the gold should not be heated sufficiently to cause it to bubble. For ordinary work, from three to five pounds' pressure is sufficient. Three pounds for large inlays and five for the small. Pressure should be maintained for at least three minutes after casting, for if this is not done, you will frequently find the sprue wire pulled away from the inlay or having a long bubble or cavity in it and the margins of the cast rounded. The best results are obtained in casting with pure gold or pure gold and platinum alloy, although good results may be obtained with 22-karat gold plate. In the restoration of incisal edges and the making of large fillings in molars and bicuspids, it is unwise to cast these of pure gold, cast pure gold having about the same strength as lead. No doubt some of you have had the experience of seeing your gold cast batter down and cause the tooth so filled to split or a cusp to fracture. If three per cent. platinum is added it produces an alloy that is very satisfactory and is harder than a malleted gold filling and will not change its form so as to allow the foregoing unfortunate accident to occur. Inlays should be finished and polished completely before they are placed in the mouth and after cementation the margins should be carefully burnished with a smooth flat burnisher in approximal surfaces and a large round burnisher in the occlusal as many regard the burnishing of the finished inlay of utmost importance.

DISCUSSION.

DR. H. B. TILESTON: When Dr. William H. Taggart announced to the dental profession in 1907 his method of casting gold inlays, and demonstrated the technic of his process before the Dental Society of New York City, an event which Dr. Ottolengui enthusiastically heralded as ''The Arrival of the Fittest'', he started a wave of enthusiasm which quickly involved the whole dental world and which has survived even unto the present day and to this very hour.

While Dr. Taggart's technic as given at that time was, as to its main essentials, practically perfect and complete, experience has added a detail here and there, and thoughtful, observant men have evolved and are constantly evolving new ideas as to methods in following out the technic in its several steps, with the purpose in view of either simplifying the process, or making more certain a perfect result.

The paper Dr. Hinman has presented is a valuable contribution to these ends, and I know of no one better fitted than he is by natural ability and great experience, to add something of value to the sum of our knowledge upon this subject of casting inlays.

I agree with the essayist fully in his statement that the inlay is not universally applicable to all classes of cavities. I would add to those he mentions as being best conserved with cohesive or non-cohesive foil or a combination of the two, fissure cavities in molars, which can be best and most expeditiously filled with non-cohesive gold. If such a cavity involves a large part of the occlusal surface an inlay would be indicated, in which case a burnished gold or platinum matrix packed with sponge gold and saturated with gold solder is just as effective as a cast inlay, and is much more quickly done.

The application of the gold inlay to restorations of normal contour in proximo-occlusal cavities in molars and bicuspids is its field of greatest usefulness. The ease with which any amount of lost tissue can be built out removes all reluctance to heroic cutting in cavity preparation, permitting the placing of buccal and lingual margins well away from contact with the approximating tooth, and the placing of an occlusal step sufficient to fulfill the cardinal requirements mentioned by Dr. Hinman, of supporting the inlay against the stress of mastication. Another feature of vital importance is the possibility of making a positive contact point. And it is a matter of nice discrimination to get that contact point exactly where it ought to be to best serve its purpose. Dr. Hinman touched upon that casually in his paper and I hope he will discuss it more fully in his closing remarks.

Judging from what has been frequently said and written, the greatest difficulty encountered by many operators is to get a perfect fit at the gingival wall and margins in approximal cavities in molars and bicuspids.

There are two essentials to success in this particular and when they are carefully observed there need be no failure. The first is to get the wax firmly moulded against and over the gingival wall and margin. Where, by reason of the presence of an open cavity in the approximating tooth or where the next tooth is missing, ready access is had to the gingival region, there is no difficulty in getting the wax adapted to and over the wall. I say not only to and firmly against this wall, but over and beyond the cavo-surface angle. The wax may be left quite thick at this point if you please, for the impression will be so clearly marked that the casting may be filed to exactly what is wanted. A little attenuated overlap at this point will not only do no harm, but will be a positive advantage. I challenge discussion of that statement.

When the approximating tooth is present in its entirety and the cavity is deep from occlusal to gingival it is not so easy to secure accurate definition of the gingival wall and margin, but it may be done in this way. After the softened wax has been forced as far into the axial and occlusal parts of the cavity as it will go, it should be at once removed by grasping the bulky excess with thumb and finger and lifting it out. The cavo-surface of the impression is then quickly dried and a little wax is fused from the point of a waxing tool upon the gingival portion and upon any part of the step portion which has not reached to any deep parts of the step, and the wax immediately returned to the cavity and firmly pressed home.

Instead of having the patient bite upon the wax, which is apt to distort the impression, the occlusal surface should be carefully carved for contact, just as one would carve fresh amalgam. The buccal and lingual margins will appear well out into the embrasures where they can be reached and carved accurately, or further adapted with a warm instrument. An extremely thin steel rib band is now passed between the teeth, cutting off most of the excess of wax in the region of the gingival wall. What is taken from the contact point by this procedure can be readily restored with a bit of solder, which makes a harder and better contact point than the casting and it can be placed where it is wanted.

The second requisite to success in this particular is to place the sprue wire in the occlusal surface directly over the gingival wall so that the gold will be cast straight against that wall and not toward the step portion, as it would be in case the sprue wire were inserted at, say, the contact point on the axial surface.

Careful observance of these two points in the technic will obviate the difficulty of getting adaptation of the inlay at the gingival in every case.

Another point mentioned by the essayist is the necessity of maintaining a moderate amount of pressure upon the molten metal for several minutes after it has been cast. For this reason I favor the centrifugal casting device, which maintains an even pressure after the gold is thrown into the mould and gradually cools the mass while still under pressure, by whirling through the air. This fact makes clear also the advantage of casting directly toward and against the gingival wall, since the molten gold is held and compressed into that part of the matrix by the centrifugal force, while cooling.

Dr. Hinman has presented many little points in the technic of casting which will prove helpful in their observance. It must be remembered that it is the faithful putting into practice of the little things that makes the finished work perfect.

DR. H. J. EMERY: I am truly thankful to Dr. Hinman for his clinic and paper. He has presented both with clearness and simplicity. If he has failed to get it across it is certainly our fault and not his. I take it for granted that he still employs the direct method in cavities having four walls. I am certain we would be wasting time in cavities of that class to follow his technic.

It is a fact that contraction and expansion must be considered in making gold inlays of the occluso-approximal type, for it has long been recognized that they do not fit. Dr. Stewart, of Cincinnati, gave us a very good method to overcome shrinkage, that of using thin platinum foil as a matrix for the wax, and then flowing a lower cast gold along the margins, having cast pure gold into the matrix. My objection to Dr. Stewart's method is the extra time required, and the fact that I do not cast with pure gold, for the very good reason that it is not hard enough, 22k giving better service.

The profession is finding out that inlays are not to be used in every case, but must be used only in cases that are suitable for them. I might mention that I often drop a small amount of hot wax on the wax model at the approximal to restore good contact.

I, like most other inlay workers, have tried many waxes, but the best wax in my hands is Kerr's, made by the Detroit Manufacturing Company. I am using Kerr's wax with dry heat, working it in my fingers. It softens at a low temperature and gets quite hard in the normal mouth temperature. Of course I use a stream of cold water to chill it.

I agree with Dr. Hinman regarding the use of stones and a wet cavity. I consider it about the only safe method of analgesia. I have found Dr. Jamson's Ideal investment material best in my hands. And let me say now, with due regard to Dr. Hinman's well-known ability, that I don't weigh or measure anything, but I do get a uniform mix by a more simple method. It is not original either. Some of you here will remember how Dr. Kettig used to mix plaster. He called it a saturated solution, which it was not, because you can't put plaster in solution. I simply shake my investment into an excess of water and let it soak, then pour off the water and you are not bothered with air bubbles. Dr. Jamson's investment sets fast, and is a time saver. You can have your cup or ring on the fire in five or ten minutes.

Dr. Hinman calls our attention to the expansion and contraction of gold and fails to take advantage of the expansion and contraction of the investment material. He says he casts into a cold investment. In my opinion he is wrong there. Heat in moderation will not hurt the mold, and it is bound to expand the mold and compensate to a marked degree for the loss by contraction of the gold.

It perhaps is not out of place to say that Dr. Callahan, Dr. Schott and I, myself, have often taken advantage of the use of soft foil to compensate for shrinkage at the gingival in approximal cavities. I want to thank Dr. Hinman again for his most excellent paper and clinic.

DIAGNOSIS AND SURGICAL TREATMENT OF CERTAIN DENTAL DISEASES*

BY CHALMERS J. LYONS, D.D.Sc., JACKSON, MICH.

IN THE ROUTINE of his daily work the dentist frequently comes in contact with certain pathological conditions whereby surgical procedure must be resorted to in order to obtain the successful results which are demanded of him in this age of progressive dentistry.

It is to a few of these conditions that your attention will be called briefly in this paper.

In the practice of dental and medical science there are two paramount factors that stand out very conspicuously. The first of these is the production of pain and the second is its elimination.

The physiological and anatomical nature of pain itself has not been given the consideration by the dental profession that has been necessary to accomplish the most positive results. In just the ratio that the dentist understands the physiological and anatomical nature of pain will he be able to treat those lesions with which he comes in contact so as to exert the maximum amount of skill in its elimination.

It is characteristic of all sensory nerves that the sensations caused by any stimulation of them beyond a certain degree develop that state of consciousness which we are in the habit of speaking of as pain. The terminal organs of the skin and mucous membrane are such as are only affected by pressure or by temperature. Conversely pressure or a variation in temperature brought to bear on a nerve trunk instead of on the terminal organs produces no specific tactile sensations of pressure or temperature, but merely general sensations of feeling rapidly rising into what we call pain.

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*Read before the Kentucky State Dental Society, 1913.

Any derangement of function which would cause pressure on a nerve trunk or a stimulation of the tactile end organs of the skin, or mucous membrane, beyond a certain degree, will produce the sensation commonly known as pain.

Pain may be classified under two heads:

First. Direct association of pain and cause.

Second. Referred or reflected pain.

The correct diagnosis and treatment of pain under the first head is not a complex problem for the source of irritation and the seat of pain are to be found in the same place.

REFLECTED PAIN

Pain in any part of the mouth not associated with an exposed tooth pulp in that particular region, and where not associated with an increase of temperature, the symptom of local inflammation must be looked upon as a reflected pain, and should be regarded as a pain depending upon a cause situated remotely from where it is felt. These pains are frequently spoken of as sympathetic pains because of the lack of knowledge regarding them. They should be considered in their obvious and more natural relations. They should be regarded as resulting from some direct nervous communication passing between the part where the pains are expressed and the real but remotely situated source of irritation. When a patient complains of pain and there is definitely established no association of pain and cause in the same region, the proper way of regarding this question is to ascertain what association of nerves will explain it. It is through the medium of the distribution of the sensory portion of the fifth nerve that we are enabled to explain these pains, which are called sympathetic, but which result from a continuity of nerves between the cause and effect, the disease and the symptom or the source of irritation and the seat of pain.

On account of the wide and extensive distribution of the fifth nerve, it behooves the dentist to be on the alert for these nervous disturbances. Probably one of the greatest sources of irritation that sets up these reflected pains is the impacted lower third molar. In the development and eruption of this tooth in many instances there is not sufficient space provided by nature between the coronoid process and the distal surface of the second molar for the tooth to erupt into normal position; in fact, the tendency of maxillary development is to render restricted space the rule rather than an exceptional occurrence. If the distance between the columns of the coronoid process and the distal surface of the second molar be very short, it is evident that upward eruption is impossible, so that the tooth may assume any direction of movement, the most common being forward, the axis of the tooth changing its position until the tooth may lie in a horizontal position or even become inverted. In some of these cases when the space between the coronoid process and the distal surface of the second molar is so scant the tooth may assume a natural direction but there will be no room for the gum tissue and it will be crowded out over the occlusal surface of the tooth, and by the process of mastication an acute inflammation be set up and maintained. This may not limit itself to just the part involved, but may extend to the tonsils and fauces, the acts of deglutition becoming painful and the motions of jaws restricted. Reflected pain may be set up by this irritation and become seated in any part of the head supplied by the trifacial nerve and its branches. Sometimes the teeth in their effort to erupt will exert a pressure sufficient upon the distal surface of the second molar so that a pressure resorption of it will occur until in some cases the pulp chamber is encroached upon and a direct irritation to the pulp of the second molar results. The root development of these teeth will frequently cause impingement of the root upon the inferior dental canal and reflected pains of the most violent nature set up in this manner.

When it has been determined that the impacted lower third molar is the source of irritation, the immediate removal of the same is indicated.

The writer here wishes to emphasize the word removal—not extraction —in this class of work. In his opinion the removal of impacted teeth has been held altogether too lightly by the dentist. It should be considered a surgical operation and treated as such, and all surgical precautions should be taken in carrying out the details of the operation.

This operation under the most favorable conditions is not performed without some attendant danger.

The first principle in the removal of impacted teeth is that the surrounding bone, which may greatly interfere with their removal, must be cut away before attempting to dislodge the tooth. The amount and position of this bone can be definitely ascertained only by means of the radiograph. A good radiograph should always be secured before attempting this operation.

The surgical mallet and mastoid chisels have been the most successful instruments in the writer's hands for removing the surrounding bone. By the use of these instruments the land marks in the field of operation are not destroyed as they sometimes are by the use of the dental engine and surgical burs.

After cutting away the bone above and posterior to the tooth, the chisel is driven between the buccal process and the impacted tooth and the process pried away; then the tooth can be easily dislodged by means of a spade elevator. By this method experience has proved that less traumatism has been made upon the tissues than by any other method that has been brought to our attention.

The post-operative treatment in this operation should not be overlooked. Iodoform gauze packed lightly in the wound immediately after the operation will yield good results. This should be changed every twenty-four hours for three or four days, and the wound sprayed with a saline solution. Surgical cleanliness throughout the operative and post-operative period should be maintained, if good results are to be expected.

FRACTURE

A condition indicating surgical procedure that the dentist sometimes comes in contact with, either from some violence befalling the patient, or from accident resulting from extraction, is that of fracture, and a word or two relative to the treatment of this condition will perhaps not be out of place.

In the first place nature has provided a splint far superior to any which the dentist can create in the majority of cases of fracture which present for treatment. This splint is the cusps and sulci of the natural teeth. By setting the teeth in normal occlusion the fractured parts are forced into normal position; then by retaining the normal occlusion, by means of wiring the upper and lower jaws together, (using the Angle fracture bands for this purpose) for a period of thirty days, perfect union of the parts is established and normal occlusion is maintained. If the fracture bands cannot be easily obtained, the regular orthodontic bands may be used. The patient must live on liquid food during the process of repair, and care should be exercised that the lower jaw is absolutely immovable during this time. No bandaging is necessary to keep the lower jaw fixed, as the wire, if drawn taut, will be sufficient.

During the convalescing period the mouth should be kept as clean as possible by the use of sprays, etc.

NECROSIS

Another pathological condition which the dentist must care for is necrosis of the jaws. How are we to determine this condition? When sequestra of bone have been formed, there is usually a discharge of pus. By exploring with a probe such bone will be found to present a rough surface. Sometimes a slight motion of the sequestra will be detected. Surrounding bone not yet disintegrated is also recognized by its rough feeling. In the acute stages, when pain and other symptoms of acute inflammation are present, and before nature has had an opportunity to complete the process of separation between the dead and living bone, the treatment is limited to measures which relieve pain and check the progress of inflammation. Painting the surface with phenol iodide serves the purpose of a counter irritant and antiseptic. Capsicum plasters applied to the mucous membrane over the point of greatest tenderness sometimes give relief. All of the body-eliminating processes should be stimulated.

The separation of the sequestra must be left to nature; we can render no direct assistance, but the practitioner must see that nature has a fair chance by attending the general health of the patient and keeping the diseased parts clean. After the sequestra of bone has been removed, the bone borders must be smoothed by curettes or the engine burs until smooth, healthy bone is obtained.

The wound should be packed with iodoform gauze and changed every twenty-four hours until healthy granulation takes place.

Cases are on record whereby a portion or all of the mandible has been exfoliated by necrosis when some infection has been allowed to gain access to the medullary portion of the bone and osteomyelitis or disease involving the bone marrow and central or cellular parts of the bone is established.

A case is reported in one of the recent numbers of one of our dental journals in which there is a loss of the entire mandible by this process.

We have a case now in the University Hospital at Ann Arbor of a beautiful little girl, aged six years, in which she had the first deciduous molar extracted about six months ago, presumably for an abscessed condition. There was no post-operative treatment followed up as far as we were able to determine by the history of the case when presented to us for treatment. The medullary portion of the little mandible became infected, supposedly from the spreading of the process in the removal of the widely branching roots of the tooth, and osteomyelitis in a violent form developed. We were unable to stop the spread of infection until the entire ramus of the lower jaw on the affected side was exfoliated.

These cases are simply mentioned to show that in every case of extraction, particularly when an extensive wound is made, or in the extraction for abscessed conditions, the case should always be followed up with post-operative treatment. A successful general surgeon would never think of making a wound of this character and severity in any part of the body and expect nature alone to make repair. Should we, as educated dentists, do less?

CHRONIC ALVEOLAR ABSCESSES

It is not germane to this paper to go into the therapeutic treatment of any of these pathological conditions, but to touch briefly upon the surgical procedure.

When the radiograph shows an infected area around the apical end of the root of a tooth and the tooth will not respond to any of the well-known and recognized therapeutic treatments, there are just two things left to do to save the tooth. First, to remove the source of irritation; second, to establish good drainage. This is accomplished by excising the apical end of the root down to healthy tissue. This operation is performed by sterilizing and filling the root canals, then, by means of a cross-cut fissure bur, cut off the diseased end of root going through the soft tissues and alveolar processes in the operation. The wound should then be thoroughly curetted and packed with iodoform gauze. This is for the purpose of establishing good drainage. The packing should be reduced in size each time the wound is dressed until granulation is established and the wound filled with healthy tissue.

EMPYEMA OF THE MAXILLARY SINUS OR ANTRUM

Formerly it was considered that 80 per cent. of this disease was due to dental origin and 20 per cent. to nasal affections and affections of the accessory sinuses. However, today many investigators and best operators contend that less than 15 per cent. have diseased tooth roots as the etiological factor in this disease, and that 85 per cent. are secondary to pathological conditions of the nose and accessory sinuses. In the writer's opinion the dentist should not undertake to treat empyema of the antrum unless he is absolutely satisfied it is from dental origin. When this is determined, there are just two things to do. The first is to remove the source of irritation; the second is to irrigate and establish drainage. When it is necessary to open from the oral cavity, the writer's preference is the Kuester operation or by the route of the canine fossa removing enough of the anterior wall of the antrum to permit free exploration of the cavity. The cavity is then irrigated with saline solution and packed with iodoform gauze. This should be removed in forty-eight hours and antrum irrigated every forty-eight hours until normal conditions are established. The opening through the canine fossa may be closed by making a button of gutta percha and gradually reducing its size as granulation of the tissues takes place until the opening is closed.

The treatment of all of these cases can best be accomplished in cooperation with the rhinologist. Many of the cases can be cured by the intra-nasal operation after the source of irritation has been removed. The naso-antral entrance is preferable because it offers less opportunity for infection than does the operation from the oral cavity. The naso mucous membrane and the antra mucous membrane are continuous, the pathogenic organisms affecting the one are the same as those that affect the other and in the writer's opinion the dentist's work in the treatment of empyema of the antrum will be more effective with the dentist and rhinologist as co-laborers.

MALIGNANT DISEASES

Just one other subject will be presented briefly before closing. What is the responsibility of the dentist in malignant diseases of the mouth?

Considering, on the one hand, its invariable outcome unless successfully treated, the suffering of the victim and the improbability of successful treatment in the advanced stages; on the other hand, the success or long periods of immunity that may follow comparatively simple early operations, the importance of early diagnosis cannot be overestimated.

The study of malignant diseases of the mouth should receive the same careful attention by the dentist that any other part of his work is receiving, so that he may be able to look with suspicion upon any unhealthy condition of the mouth, and to ascertain the nature and character thereof.

Blair states, "Until the much-desired cancer specific is discovered, it is mainly to the educated dentist, grounded in general oral pathology, who makes complete though quick survey of the whole mouth that the medical profession and the public must look to reduce the now increasing death rate from cancer of the mouth and tongue."

Assuming Blair's statements to be correct, then it is the moral duty of every dentist not only to examine the teeth of his patients, but to make a thorough superficial examination of the whole mouth, lips and tongue. Any rough surface on the teeth which is producing a constant irritation should be removed. In cases of chronic ulcers or sores on the tongue or lips, a complete history should be obtained. If the history should lead to former syphilitic affections or should it develop that the pathological condition is caused by an irritation from inveterate smoking, that condition should be looked upon with grave suspicion, and steps should be taken at once to make a complete microscopical examination so that a correct early diagnosis may be made.

We must ever keep in mind that any constant, continued irritation may predispose to malignancy. There is no part of the human body that is subjected to continued traumatism as the mouth, lips and tongue, for the reason that in the large majority of our patients over forty-five years of age, the predisposing age for malignant diseases, the teeth are usually more or less affected by caries and will present sharp and uneven surfaces which may produce a constant irritation that may ultimately lead to malignant trouble.

If we as dentists will keep pace with medical progress, we must not only be skillful dentists, but we must have a familiar knowledge of oral pathology, that we may be skillful diagnosticians in these pathological conditions which come within the realm of modern dentistry, that we may be able to advise intelligently the best course for our patients to pursue to obtain relief from some of these diseases which afflict mankind.

SODIUM CITRATE FOR CLEANSING AND STIMULATING THE GUMS AND FOR PYORRHEA ALVEOLARIS*

BY DR. GEO. W. COOK, CHICAGO, ILL.

Sodium citrate, for cleansing, and stimulating the gums, and for pyorrhea alveolaris. This is used in the place of pumice powder. Will not clog the mucous glands, as will pumice. A neutral crystalline powder, very effective for polishing. Will dissolve the mucoid deposits. Is used on rubber or other disks, and leaves some of the powder in the pockets of pyorrhea, after scouring the teeth, over night. Large deposits (calcareous) should of course first be removed.

This is not of itself a solvent of tartar, does not attack inorganic substances. Hydrogen dioxid is better for removing green stain on children's teeth. Used too frequently it causes erosion. This is simply a fine adjunct for cleaning teeth and for pyorrhea pockets.

Potassium tartrate is hardly as good as this preparation. An old man who was enthusiastic about the sodium citrate told me he put in an hour every week cleansing his teeth with it. I would not say whether it should be used daily on the brush.

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*Clinic at Northern Ohio Dental Society, 1913.

DISEASES OF THE GUMS AND SOCKETS.*

BY M. H. FLETCHER, D.D.S., M.D. M.S., CINCINNATI, OHIO

YOUR COURTESY IN ASKING ME to address you is very much appreciated. In leading your thoughts this evening will you kindly follow the reasoning of one who has given much time and attention to the subject to be discussed?

"Diseases of the Gums and Sockets" is the subject to be considered. Perhaps nowhere else in the human body is disease more universally found. It exists in aboriginal tribes and has also been found in some domesticated animals, though not in their normal state. Thus it is seen to be associated with mankind only. Grain and herb-eating animals clean the teeth and harden the gums by long mastication of rough foods. The conical teeth of flesh-eating animals are cleaned to the gums with every bite they make into their food, or each time they gnaw bones. This rough treatment of the soft tissues of the mouth develops connective tissue in the gums on the same principle that callosities are developed on the soles and palms. This is also shown in the gums and the callosities developed on the upper front jaws of all cud chewers. The lack of upper front teeth in these animals necessitates the rough grass and other foods coming in constant contact with this part of the mucous membrane. Hence this toothless part of their mouths becomes as hard and resisting as one's heel. This point will be shown later in the specimens. These animals also have a welt of hard callous tissue surrounding each tooth, in consequence of the continuous rubbing of hard substances against the gums. These animals do not have irritating quantities of tartar deposited on the teeth, because it is continuously brushed away by the rough foods. This is true in face of the fact that their saliva is much more alkaline than it is in man. Thus, these animals unconsciously do the prophylactic, or preventive, treatment of their mouths, which mankind can do only by conscious effort with the tooth brush, picks and floss.

It is the patient or individual who does the preventive or prophylactic work. The doctor does the surgical work. When the oculist removes dust, or other foreign substance from the eye, he is doing surgical work. It is up to the patient to prevent dust from getting into the eye, tartar from coming upon the teeth, etc. Do we know how to teach patients to do this prophylaxis? Oral hygiene, as now taught, is our greatest step forward in preventive medicine.

When calcareous deposits are found about the gums and have produced irritation and open sores, the doctor removes the foreign substance and sterilizes the wounds. These tissues heal the same as elsewhere in the body. This is the principle upon which all wounds are treated by intelligent surgeons. When concretions are found in the eyelids, tonsils or joints, they are removed and the tissues get well.

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*Read before the Kentucky State Dental Society, May, 1913.

In the soft tissues, boils, felons and abscesses are found. These are opened for the escape of pus. The diseased tissues are often cut away to assist the process of repair. In bone disease the dead and unhealthy bone is removed to assist Nature in repairing the damage. In bone disease the overlying tissues are always more or less involved. But when the bone is well the soft tissues get well and they do not heal until then. When teeth are removed the surrounding tissues all return to normal. This alone is convincing evidence to me that some irritant getting on the roots, or into the sockets, is the greatest cause of alveolitis. This is apparently the field in which to seek for the causes of this almost universal disease.

The fact that animals living in their normal state do not have alveolitis, should certainly be a hint to us as to how to instruct our patients to prevent it and a pointer as to the treatment. "Nature is a wise teacher and her lessons may be studied with benefit."

The tissues about the teeth are exactly the same as they are in other parts of the body and should be treated on exactly the same surgical principles. Prominent dentists have said, "It is acknowledged that we cannot stop this disease after it comes." This may be true in isolated teeth or in special cases, just as it is true that cases of joint, bone, and other diseases are at times beyond the ability of the surgeon to fully diagnose and treat successfully. But it is up to us, as dental surgeons, to be familiar with the pathology and its rational treatment, in order that the greatest number of cases may be induced to heal.

The doctor does not "cure." Nature does that part. The best doctors are they who know the conditions and apply intelligently the most rational treatment. They know that if the case does not recover it is the lack of knowledge on the doctor's part as to how to remove the exciting cause. Nature is always ready to heal, provided the cause is removed. But for us to say, "It is acknowledged that we can not stop the disease," is to stamp our profession with the lack of progress and a lack of intelligent energy. Alveolitis is subject to the same laws of prevention and treatment as are other diseases.

One writer has said, "Evolution is a law of nature. It is also a law of medicine. Yet habit and custom are the deadliest foes to evolution and a millstone tied about the neck of progress. It is infinitely easier to learn something new *than to unlearn that to which we have become accustomed.*" See how the general surgeon has progressed. Contrast the difference between the preparation and technic of a surgical operation of today and that of a decade or two ago. Have we, as a dental profession, progressed as surgery has? We have comparatively few surgical conditions which naturally fall to us. Certain diseases of the mouth and their treatment are left us by the surgical and medical profession. Yet are we not lacking in progress? Let us, this evening, cast aside the millstone of habit and study the actual conditions of the three or four surgical diseases which are left us for treatment. Let us prove by intelligent discussion of the anatomy and pathology that we deserve the title of doctor, which the law has given us.

The causes and progress of alveolitis, it would seem, are as follows:

The laws of health teach us that we cannot have diseased tissues without a lesion. The gums of the human teeth, during the whole of adult life, have a constant and ever-present cause for lesions where they come in contact with the teeth. You will note this disease never starts anywhere but at the gum margin. The cause of the lesion is tartar which has become hard and irritating. Bands, rough fillings, the edges of cavities, etc., may simulate tartar in its effect upon the gums, periosteum and bone. These things are continuously irritating because they are stationary and fastened to the teeth. In no other place in the body can such conditions be found. A splinter or foreign substance in the tissues elsewhere would be floated in pus until it reaches the surface and is discharged. In alveolitis the irritant is attached to the tooth and can be disposed of only by Nature throwing off the tooth itself. This she does and will continue to do unless the cause be removed by the doctor. During this process of throwing off a tooth all the stages of inflammation, diseased bone and the overlying tissues may be found that are found in other diseased bones of the body. In this instance, however, inflammation of the bony socket is perpetuated by the ever-present calcic deposits about the teeth, or by bacterial infections which have found lodgment in the cancellous bone. Infections may perpetuate the disease long after the deposits have disappeared from the roots. Often the death of bone through this infection is very extensive, reaching the antrum or nose. In the lower jaw much cancellous bone may be destroyed. These features will be shown in the pictures and specimens, also in the clinic.

The use of the word "Alveolitis" has been criticised, but you will find, by consulting a Medical Dictionary, that the word means diseases of the sockets and alveolar bone. Using the word "Alveolitis" in place of "Pyorrhea Alveolaris" is much more simple and direct. It indicates inflammation, locates the disease and permits a description of the various stages of the disease without paradoxical terms. Lastly it gives the dental profession credit for being more direct and scientific in its work. For instance, we may say Simple Alveolitis, Chronic Alveolitis, Necrotic Alveolitis, Suppurative Alveolitis, etc. This is the language in which all other surgical diseases would be described. The name Pyorrhea Alveolaris is only a description of one phase of the disease and cannot be properly used as a name for all the stages. My feeling is that the dental profession, as a whole, will never learn to think of the disease, in all its phases, *until it has discarded the name Pyorrhea Alveolaris.* This would do away with the idea of calling these several stages of one disease by different names as some propose. A generic term like Alveolitis permits of a perfect description of the different phases of the disease, as above shown. This plan is followed in nearly all surgical diseases.

The treatment to be adopted for Alveolitis depends upon the stage it has reached. But in *all* cases the deposits must be absolutely removed from the roots and necks of the teeth. No amount of applications to the gums, pure and simple, will induce any case to heal while deposits are present to any degree at all. If the disease is in its simple form, the removal of tartar or the mechanical irritant is sufficient. If the case be chronic and more extended, the deposits and some of the dead alveolar process must be removed and the wound sterilized. If there be much extension of infection and dead bone, deeper seated curetting and burring must be done. The wounds must be kept sterile sufficiently long for the bone to re-form and fill them. If it is suppurative and necrotic, and the two conditions nearly always go together, the cleaning and curetting would need to be more thorough and extended. The treatment must, therefore, be continued a few weeks longer before one could expect recovery. One would not look for a broken bone to recover inside of six weeks or more. Why should we expect bones in the alveolar process to heal in a shorter time? Let us apply the common-sense laws of treatment to the diseases of the gums and sockets that are applied by general surgeons elsewhere in the body. They have made the way plain, let us go in the way.

11 East Seventh St.

THE IMPORTANCE OF CROWN AND BRIDGE WORK.*

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THE GROWTH OF CROWN AND BRIDGE WORK is so interlaced with the growth and progress of dental science, that it can be hardly separated from dentistry as a distinct specialty without losing its identity. In short, a crown and bridge worker must be as successful in the operative part as in the mechanical work required for this specialty.

In order that we may better understand crown and bridge work and its dependence upon dentistry in general, we must always consider its relation to surgery, and the more crown and bridge work we do, the greater need we shall find for every precaution to be observed, considering a hoplelessly diseased tooth as an irritant, and its removal necessary for the general health of the patient and the conservation in the future of the remaining teeth in the mouth.

Time will not always permit, however, of examination necessary for us to study just the kind of bridge work that is needed for a particular case. Many things are to be considered, length of bite, with a view to how much the bite should be opened, number of abutments, what kind of bridges and crowns should be used for the best advantage, and many other important points; hence it is best to pursue the method of having the patient bite into modeling compound from which creditable articulated plaster casts (which we term study casts) can be run, and from which, at a convenient time, we can study the general conditions of the mouth. The importance of these examinations from plaster casts is fully explained in my paper which I read before the Cleveland Dental Society, and which appeared in the February number of *The Dental Cosmos.*

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*Read before the Lake Erie Dental Society, 1913.

From our study of the mouth of the patient, and also from our continued study of the conditions as revealed by the articulated plaster casts (or study casts) we are able to make a selection of abutments for bridges, and also to select teeth that can be effectively crowned or restored by any dental means at our command.

In medicine, the oral cavity is considered of importance as the beginning of the alimentary canal; in surgery, as an avenue for infection; therefore, neglected teeth are a means of causing many ailments which can be cured only by surgical interference. In dentistry, with the assistance of crown and bridge work and oral prophylaxis, the teeth and gums are kept in a healthy condition thereby not only lessening the duties of the surgeon by minimizing surgical interference, but also assisting by restored occlusion in more easily and thoroughly digesting food because of its having been properly masticated. The teachings of Fletcher and others emphasize to the medical as well as to the dental profession the importance of food mastication, and the public in general are responding to the education along these lines.

In our large cities, physicians whose duty it is to examine men who make application for a position on the police force, fire and other departments, where physical exertion is required, also examine the mouth of the applicant to ascertain whether he has teeth that will occlude with the corresponding teeth on the opposite jaw so that the weight of the bite is supported. If an applicant has spaces on either side of his mouth caused by missing teeth, he is required to have bridgework made and adjusted before his application will be considered—another evidence of the importance of crown and bridge work.

From a surgical standpoint all teeth that are diseased must be extracted; from a dental standpoint, as crown and bridge workers, we limit our extractions to those which are hopelessly diseased, depending upon stronger teeth to support our work. One of the most important points in crown and bridge work is the ability of being able to diagnose the vital resistance of a tooth which is diseased to such an extent that its uses will or will not be practical as an abutment for a bridge or a foundation for a crown. Many lame teeth through treatment can be made useful in dentistry and afterwards prove to be very successful organs. However, much depends upon the individual and the stage to which the tooth is diseased, and also to what extent the surrounding tissue is affected.

In speaking of a tooth, we shall, for the time being, refer to it as a whole, including with it the pericementum, its most important membrane in adult life, the vitality of which is equivalent to the life of the tooth after the pulp is removed, and which also performs the useful function of retaining or holding the tooth in its position in the jaw. A tooth with a diseased peridental membrane can by treatment, and with the assistance of proper instrumentation become tight in the jaw, thereby relieving the tissue from irritation of calcareous deposits and suppurative soft tissue, and then be used either singly or as an abutment for a bridge.

In nearly all such cases, however, that abutment should be kept under observation, for when suppuration has caused the partial destruction of the membrane, or even in cases where a pocket has been formed around the tooth, we have lost in part the vitality of nature's retentive apparatus for the tooth. This tooth, or abutment, may be considered useful, but this stage of usefulness can by no means be considered a permanent cure for this tooth, as thoroughly explained by Dr. H. E. Friesell in his paper which he read at Atlantic City last summer, in which he made the statement that pyorrhea was incurable; but that it will yield to treatment under certain conditions, and if oral prophylaxis is practiced, the patient kept under the dentist's care, its progress can be deterred by carrying on the treatment at the intervals this particular case may require.

A normal tooth when solid in position in the jaw can be subjected to any reasonable masticating strain as an abutment for a bridge, provided that the stress is thrown upon it in the proper direction, and that it is sufficiently braced by the bridge work which contains it, thus serving as a permanent splint, and preventing a prying motion in any direction.

IMPORTANCE OF SUPPORTING TEETH

In bridge work we find in looking for abutments many teeth that have become loose simply because of the loss of the tooth ahead, or the loss of other teeth in the mouth, causing undue stress to be thrown upon the remaining single tooth in that portion of the mouth, thus breaking up the support which one tooth must have for the remainng teeth in the mouth, or where one tooth maintains the strain of an entire side of the jaw, while on the opposite side we have fair occlusion, or where each side may be in the same condition. We often see cases with a few teeth in one jaw and many teeth in the opposite jaw, which could be used were these teeth to articulate by means of bridge work.

Teeth which stand alone, if not properly bridged, lean forward or backward, and consequently much stress is thrown upon them during the process of mastication, which results in the teeth being thrust forward or backward owing to the fact that they do not articulate squarely upon their masticating surface, and as time goes on the leverage caused by masticating upon them results in their loss.

HOPELESSLY DISEASED TEETH

Lame teeth, or teeth diseased to such an extent as to have affected the life of a portion of the peridental membrane, causing annihilation of that portion from suppurative process, when they do become solid in the jaw after recognized forms of treatment, such as the removal of all parts of the diseased peridental membrane, removal of the tartar on the teeth, smoothing the surface, use of astringents and stimulants to the bone and gum tissue, they are retained in the alveolar process by a capsule of tissue, but in extreme cases these teeth are the same as a foreign body, or an implanted tooth, and are liable to be thrown off.

IMPLANTED TEETH

The same thought may be applied to implanted abutments. Nature seems to use every effort to make an attachment for an implanted tooth; there seems to be every effort on the part of nature to fasten even an implanted natural root firm in the jaw for a time, but later on the tide turns and the inclination is to throw it off.

The new departure made by Dr. Greenfield in cutting out with a trephine a circle in the bone and then implanting a platinum root with a hollow center, leaving a core of bone to fill in the center to unite with the bone on each side of the implanted platinum root through the spaces in the side of the platinum root, seems mechanically correct, when used judiciously and in places where there is no danger of cutting into an artery, as there would often be by drilling into the alveolar ridge of the lower jaw or the danger of opening into the antrum. Here the X-ray will be of assistance in making examination preparatory to an attempt to implant. In the region where a cuspid has been extracted would seem to be an admirable place for the use of such implanted abutments if we really need them in dentistry.

Some of our eminent surgeons (I refer to Dr. Cryer and to Dr. Roe) say that all implantations are considered as foreign bodies by the bone, which will eventually shed them. Many arguments have been advanced in favor of the platinum root. Some say that it is as safe as plates which are fastened upon bones to hold the ends together until they unite. This probably is true. Surgeons say, however, with reference to plates that many of them have to be removed after the bones have united. The condition is watched, and if symptoms appear which cannot be accounted for, it is immediately attributed to the plates, which are then removed by a second operation.

It is, however, a known fact that badly diseased roots that are only partially cured, and implantations that are apparently successful, will give trouble just about the time the individual is reduced to a state below the normal vital resistance, for instance where he is run down far below par owing to sickness—typhoid fever, pneumonia, serious surgical operation, automobile accident, and so on. At such time these points of least resistance will not receive the proper nutriment they require, and will loosen up and give trouble, probably suppurative influences will be made manifest locally and throughout the body; then can we appreciate the words of Dr. Gilmer of the Northwestern, that "we are killing patients every day by leaving such a condition in the mouth." Hence we can infer that any of these irritants under these conditions will be most unfortunate to the individual at the particular time when his resistance is low.

In treating teeth for abutments a dentist cannot help but have some failures; he will have a great many lessons to learn, but experience is his great teacher, and those that come on after him can be warned of the dangerous path over which they are traveling. However, it seems necessary for each one to find out for himself these same lessons. I think most any dental teacher will concur with me on this subject that, in spite of warnings and explanations given to the dental student, he must stumble into the many pitfalls before he is fully able to appreciate them.

IMPORTANCE OF SELECTING ABUTMENTS

I desire to call attention to the importance in the selection of abutments for crown and bridge work of being able to draw the line between those which are hopelessly diseased, and those which can be saved. The English people seem to look at the matter of saving teeth purely from the surgical side, hence all diseased teeth are extracted. In this country many teeth are saved which, for the general health of the individual, should be removed; therefore, we might refer to the English people as the pessimists, and to the Americans as optimists in their ideas, so we will assume a neutral ground and try not to be over-influenced by either extreme. In dentistry we find specialists whose ideas are directed chiefly toward their own specialty, and who cannot see anything superior to the particular methods which they follow. We must be liberal in the practice of crown and bridge work, considering only the best interests of our patients.

The use of anesthetics, particularly nitrous oxid and oxygen, the dental anesthetic with which we have so long been acquainted, gives us an opportunity of treating teeth without pain in a far better way than we have ever treated them before. Old roots can be extracted without fear of hurting our patient; apices of diseased teeth and surrounding bone can be readily removed without pain, thereby effecting a cure which is vastly superior to the retaining of these diseased conditions by the drug method. The proper manipulation and treatment by the above method, assisted by the use of cocain and pressure, makes it possible for us to use teeth as abutments for bridges which, before the more liberal use of anesthetics was established, seemed impossible to save.

The growth of dental science and its importance to mankind renders it necessary for every dentist to keep abreast with his profession. We must acquire the necessary knowledge, must develop the required skill, and must have the necessary appliances in order to do good work.

For the adult patient crown and bridge work is absolutely necessary. If we can do good crown and bridge work we need not struggle with a tooth that is hopelessly diseased. We can remove it and supply a bridge which will do far better work for the patient by using as abutments teeth which are normal, and which can stand the stress of mastication. Good crown and bridge work when properly made is a blessing and not a curse to the dental profession, as are the bridges and crowns of the charlatans, and of many men who are doing poor crown and bridge work because they do not know how to do any better. A man without any mechanical ideas, or without a fundamental knowledge of operative dentistry can meet with but very little success in this field of dentistry.

The ravages of neglect by both patient and dentist are followed by crown and bridge work filling up the gaps caused by extraction, restoring molars and bicuspids. thereby giving the patient the advantage of using the remaining teeth by distributing the work evenly over the entire masticating surface, and thus relieving undue strain on the six anterior teeth in the upper and lower jaws respectively.

Crown and bridge work also serves a similar purpose and is an absolute necessity for the man who is practicing as a specialty oral prophylaxis. Pyorrhea when caused largely from mechanical strain or traumatism can be arrested only by the use of crown and bridge work, the bridge acting as a splint to the teeth that support them, and at the same time restoring mastication, thus relieving the original strain which has caused the other teeth to have undue leverage thrust upon them every time the jaw is opened and closed, resulting in their loosening, and if allowed to continue too long, their loss entirely; therefore, it behooves us to watch these conditions, and restore with crown and bridge work before it is too late.

Crown and bridge work also follows the orthodontist, in restoring missing teeth, which have caused mal-occlusion, and which he is correcting. Without separating and then restoring a missing tooth by a bridge proper occlusion is not possible, and even though the articulation is restored with the exception of the missing tooth, the teeth will go back to their original position again unless a bridge is inserted, holding them in place, and maintaining at the same time proper occlusion.

The spirit of oral hygiene is spreading throughout our country to such an extent that a greater number of the dentists each year take up the specialty of oral prophylaxis. Patients are educated to the necessity of the care of the teeth, and they have also learned that picking the teeth with toothpicks infects the gingiva, starting the first stages of pyorrhea. Dentists have also learned not to carelessly ligate, thus severing the attachment of the gingival around the neck of the tooth and laying the tissue open to infection. with a pocket forming as a result.

But when will the great problem of preventive dentistry be fully realized? When shall we reach the stage when all teeth are retained in position, and there shall be no need for restoration by means of bridges or crowns? Certainly not at the present time. The crown and bridgeworker is still a useful spirit amongst us. Pyorrhea in its destructive work is probably dentistry's greatest enemy, and to guard against it as much as possible should be our watch-word.

BRIDGES VS. PLATES

We have spoken about pyorrhea being controlled by the use of bridges, thus holding the weight of the bite and restraining undue work upon the anterior teeth. Cannot the restoration of masticating surfaces be made by the use of plates in partial cases as well as bridges? I say decidedly, no, not by any means. The bridges or crowns simply use the teeth which support them, whereas a plate is in many cases only partially satisfactory, and must be called upon as a last resort, as it has the unhappy feature of pushing the tissue back from the teeth, or pushing the teeth outward, and it is bound to cause some injury to the natural teeth around which it is fitted. For instance, to restore an upper plate with three teeth we must run a plate over the roof of the mouth, coming in contact with a great many other teeth.

We hear a great many arguments regarding so-called sacrifice of tooth structure both from patient and dentist alike. From the patient's standpoint we hear the argument that no natural tooth should be crowned, or that they are afraid to have the pulp removed. They object to having a tooth crowned or used as an abutment for a bridge, and try to convince a dentist that it is possible for him to hang four teeth upon a single abutment, or some other equally ridiculous suggestion.

To a greater or less degree the dentist often yields to the patient, and makes a piece of bridge work mechanically unsatisfactory, the use of which will result in the loss of the tooth, or teeth upon which undue strain has been thrown owing to the fact that provision has not been made for a sufficient number of abutments to support the piece; therefore, a dentist must take a firm stand between the patients' ideas and what is best for the successful making of a piece from a crown and bridge standpoint.

In my opinion it is much better to use two teeth as abutments for a bridge than to continue a plate around the neck of numerous teeth, with the danger of causing pyorrhea, and also abrasion to the surface of the teeth coming in contact with the teeth, constant irritation caused primarily by the continued movement of the plate against the teeth every time the patient breathes, every time the jaws are closed. The same argument applies to clasps that are used upon natural teeth.

Plates, however, are necessary in dentistry, and there are many cases where nothing but plates are available. They are also useful to the crown and bridge worker for temporary use while he is making a large bridge for a patient. All branches of dentistry are important when for the welfare of our patient we can apply that familiar quotation:

"Nothing useless is or low
Each thing in its place is best
And what seems but idle show,
Strengthens and supports the rest."

The health of the teeth is therefore dependent upon the individual, and the health of the individual depends upon the teeth. A good sound body is the greatest asset a man can possess. Faulty metabolism or pathological disturbance leaves a body with lessened vital resistance, and under such conditions the teeth are sure to suffer.

CONSTRUCTING BRIDGES

Considering the mouth prepared to receive crowns and bridges, we shall direct our attention toward their construction, with the view of considering many of the constructive methods, commending all the advantages they offer, and criticising a few shortcomings, so that by understanding their true value we may be able to become proficient in the practice of our profession.

In order to carry bridge work to a successful issue we must consider durability as an important factor. Crowns and bridges must themselves be able to stand the stress of mastication without bending. We have metal and porcelain to consider as the materials for the manufacture of our bridges and crowns, one or the other of which predominates to a greater or less degree.

The casting process for crown and bridge construction is very valuable. and has opened a great field in the metal construction of bridge work. Its uses, however, should be carefully studied and understood. Casting as brought out by Dr. Taggart, and applied by many others in the dental profession, has been so thoroughly demonstrated that it is not necessary to go into lengthy detail, but simply to try to point out their proper application.

I do not care to present a lengthy discussion in this paper on the merits of either metal or porcelain work, but simply to imply by suggestion that a method of construction be selected. which, when well executed, will fill all the requirements necessary for practical crown and bridge work. The first bridges used successfully in dentistry were made of metal, to which were added porcelain veneers, or facings. New methods of various kinds of bridges have sprung up, and when the fusing of porcelain was made possible and practicable to the dentist it was thought for a time that the metal work could be entirely dropped. Metal work with the porcelain veneer is still with us, and its use in considering strength and durability of bridge work should never be under-estimated.

By casting we can obtain an exact reproduction in metal of the wax form, although careless technic will render the casting process useless, and under such unfavorable conditions the wax form will represent what is desired, while an unrecognizable mass of metal represents what is obtained. The use of the casting method has encouraged dentists to cast with unknown alloy of metals formed from old bridges, metal plates, jewelry, and other scraps, thus injecting into crown and bridge work a vein of impurity, making the cast crown or bridge represent the X, Y and Z in dental metallurgy, thus linking with it a tendency toward carelessness on the part of the dentist. Considering this from a somewhat humorous standpoint, we might cite the following possible narration:

John Smith is leaving the dentist's office with a new bridge, which was made by means of the casting process. Had we been in the laboratory of this dentist a few days before, we would have found the bridge invested and ready for casting. ''Where can I obtain sufficient metal for this bridge?'' is the question which seriously confronts the dentist. At this juncture, or shortly afterwards, the door-bell rings, and enter Mary Jones. Upon examination this patient is found to be suffering from poorly-adjusted bridge work; crowns which have been made of material so thin that the wear of mastication has worn through the metal, leaving rough, jagged edges, which annoy the patient to such a serious extent that the removal of the work is imperative.

The dentist removes this mass of metal from the patient's mouth with a very pleasant smile, thinking all the time that as soon as the patient leaves the office he can take this metal to the laboratory and use it, together with some other scraps, for casting the bridge which he is making.

This narration is founded on the principles of common-day occurrence in consequence of Dr. Taggart's contribution to the dental profession, the only objection offered to this custom being the unknown alloy that the dentist is using in his bridges, and the tendency it offers to carelessness and looseness in bridge construction. The thought of carelessness is the greatest danger in any kind of bridge construction.

ANOTHER DANGER

The man who is doing crown and bridge work by casting alone is losing all the principles of blow-pipe work, and some day he will awaken to the fact that the use of the blow-pipe is almost a lost art to him. If experience in the use of the blow-pipe is not gained by the beginner in crown and bridge work, he never acquires a true knowledge of how to construct metal work, hence his field of action in this work is limited, particularly when he comes to take up the subject of removable bridge work. While the casting process can be applied with great advantage to many stages of the work, it is absolutely necessary for the student to be able to construct a great portion with the blow-pipe. In addition to this many men will find to their sorrow that where a cast portion apparently unites with a band or crown sufficiently to withstand the process of grinding, polishing and finishing, it will not stand the continuous stress of mastication thrown upon it during a period of years, but will break away showing that its attachment was largely mechanical. We may, however, see here and there little spots where slight alloying has taken place. This has happened to many who have given up the use of the blow-pipe and depended upon casting alone.

Inlay attachment or the use of gold inlays as applied to bridge work is also a matter for serious consideration. Too much credit cannot be given Dr. G. V. Black for his system of cavity preparation, as well as his many other contributions to dental science. With a knowledge of the system of cavity preparation for gold fillings in mind, one can readily adopt a modified system for the preparation of cavities for inlays, as has been so beautifully explained by Dr. Conzett, making it possible to use the gold inlay in dentistry to great advantage.

EFFICIENT APPARATUS FOR CASTING NECESSARY

Avoid the use of homely devices, for instance, tomato cans, lids of shaving stick boxes, and the like; in fact, any machine that will not give us sustained pressure at best gives us indefinite results in the casting process. Better results in casting can be obtained if the method be one which will sustain pressure until the metal has assumed a solid form.

INLAYS.

That inlays can be used as abutments for bridges cannot be doubted, and if mechanical principles are observed, with due consideration to the anatomy of the teeth and the force thrown upon them, we shall not make many errors in their use; but here comes the difficulty, many men who construct a bridge with an inlay on each end as abutments lose sight of the fact that teeth have some motion owing to the elasticity of the peridental membrane, the strain of the bridge causing the teeth to separate, and the giving way of the cement line renders the inlay useless. In all cases this can be overcome by allowing a spur to rest in the inlay, where sufficient play can be had to compensate for the movement of the teeth, and thereby prevent any strain coming on the cement line attachment.

A serious point to be considered is the question of when to use the inlay attachment, or when to use a crown as an abutment for a bridge. Where is the dividing line? This question can only be settled in the mind of the dentist by considering the amount of tooth structure, and whether the cavity occupied by the inlay is of such dimensions as to leave very frail walls; in other words, when an inventory of the remaining tooth structure is taken to find that it is not a tooth in the practical sense of the word, simply an enamel wall remaining. Such an abutment by the use of the inlay will be liable to split when later strain is thrown upon it by the bridge, hence the crown should be used on teeth of this class, while in teeth which have smaller cavities than in the one just described the inlay can be used with safety.

To cover all the conditions and every application necessary in bridge work would require a paper of such length that I fear our interest would be lost, and I will therefore say in conclusion that I trust we shall all bear in mind the principles that have been inculcated in this paper, and that by a more perfect understanding we may be able to become better critics of our own work, thus enabling us to place in the mouth bridges and crowns that will not only stand reasonable time, but also be of value to the patient and pleasing to ourselves.

REFITTING A VULCANITE DENTURE WHICH HAS BECOME LOOSENED THROUGH ABSORPTION OF THE ALVEOLAR RIDGE

BY E. W. FELLERS, LINCOLN, NEB.

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IT IS NOT AN UNCOMMON THING to have a patient come to us with a denture which has become loosened through the absorption of the alveolar ridge, and quite often the patient will say: "Now doctor I would like to have my plate tightened but don't you change the teeth because they suit me and look just like my own teeth." You readily see at a glance that what she says is correct, at least in a measure. At any rate they suit her and she is the one you have to please.

The articulation is correct, the contour and facial expression good, and to reset the teeth and get the same expression and articulation would be an utter impossibility. However, the following method will accomplish the thing you and the patient both desire to the perfect satisfaction of both. We will take for convenience an upper denture; the same method will apply to lowers:

Remove the denture from the mouth and rinse thoroughly. Then take a small quantity of very soft modeling compound and cover the palatine surface with a thin layer of the material. Then to be sure that the compound will be soft enough, drop the denture into warm water so that the material will become thoroughly softened, insert denture in the mouth and push almost to position; ask the patient to close the teeth and be careful to note that the articulation is correct.

When this is found correct, have the patient close tight together to further displace the compound, and while material is yet soft press it up well around the edge of the denture either from the inside or outside of cheek (the writer prefers outside) and lips and a perfect impression will be obtained.

If it is found on removing the denture there is too much excess around the rim of the denture, this excess can be trimmed away with a warm knife and the edge of the impression rewarmed over a small alcohol lamp flame and reinserted into the mouth and pressed to position again.

Remove the denture or impression from the mouth and invest in the lower part of the flask with the teeth down, allowing investment to come up to the edge of the rim of the impression; then proceed with the pouring up of the upper part of flask as in the usual manner, thus obtaining a model at the same time.

After the plaster has hardened sufficiently; warm the flask and separate. Remove every particle of compound and by the use of burs and scrapers make a fresh surface on the palatine surface of the old denture; and, after washing with chloroform, pack in sufficient rubber, tinfoil the model with No. 40 tinfoil, vulcanize and finish in the usual manner.

If it should be found that the old denture should contain undercuts large enough to prevent separation of the flask, these can be removed before the impression is taken.

DENTAL THERAPEUTICS.*

BY GEORGE W. COOK, D.D.S., CHICAGO, ILLINOIS

IN PRESENTING THIS PAPER to the Northern Ohio Dental Society, I do so especially to bring out some of the points that are experimentally in accordance with certain clinical findings. If I should say anything that will help a brother practitioner in overcoming some of the lesions that he is called upon to treat, I will feel that my mission has been well paid.

Dental therapeutics has been a subject that has elicited much discussion on the part of the members of the dental profession, and at the present time we are much in doubt as to what the real effects of certain medicinal agents are that we use in the treatment of dental lesions.

Almost twenty-five years ago our master, Dr. Black, gave to the dental profession the results of certain experimental and clinical studies of the antiseptic agents applied to pulpless teeth, and his experiments brought us to a better understanding of what was absolutely necessary to study certain infected areas of the canals of teeth and the tissues surrounding them. Dr. Black offered much valuable information on the use of the essential oils as antiseptics in pulp canals. After this treatment of pulpless teeth was brought forth there was much yet to be learned and understood, and that was why so many teeth became sore and lame, and usually there was more application of the agent, thinking that it was an infection, while all the time it was the result of the treatment. Practitioners of dentistry began to realize that many of these agents that were being used at the time did not bring the results that they had expected, and as a rule they would continue the treatment until perhaps the tooth was lost, never realizing that the animal tissue was as susceptible to the action of the agent as it was to the bacteria themselves, and in many instances the tissue cells were acted on more quickly and more energetically than the bacterial cells, and as the tissue cells became weakened and the growth of the bacteria was not restrained the diseased condition became more and more aggravated. As we went along with out therapeutical understanding from a purely clinical point of view, we were more and more impressed with the fact that there was much work needed to be done in the study of agents necessary to render teeth to such condition that they could be retained indefinitely in the mouth. As Dr. Black turned his attention from the study of these agents to other fields of research, there was nothing for a number of years produced experimentally to help this important phase of dental therapeutics.

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*Read before the Northern Ohio Dental Society, 1913.

Note: Dr. Cook died Dec. 21st, 1913. This is probably the last paper written by him before his death.—Editor.

The dental profession is much indebted to Dr. Herman Prinz, of St. Louis, for helping to establish a more thorough understanding of dental medicine, and today he is the peer of any member of the dental profession in helping the dentist to better understand the diseases of the mouth and teeth. Dr. Prinz with his understanding and his laboratory methods of study has accomplished much in bringing about a more rational dental therapeutics.

In the study of the chemical characteristics of drugs there have been many compounds brought out and introduced as valuable agents from a purely clinical point of view, but we must know, first of all, the effects that drugs have on normal tissue, and what effect they may have on abnormal tissue. It has been well demonstrated that the essential oils in the test tube are not very effectual on bacteria, and in the majority of instances they are less effectual in the pulp canal.

After a period covering twenty or twenty-five years, Dr. Black now is recommending the use of normal salt solution as an agent in abnormal conditions of the teeth and mouth, and we do not hear so much about Black's One-two-three of twenty years ago. Black himself has realized that most all agents, and I presume we may say *all* agents, that act upon the protoplasm of bacteria, act upon the like constituents in the tissues, and that it does, in many instances› more harm than good. Today we are at a loss to understand why many teachers of dental therapeutics in discussing disinfectants pertaining to pulp canals are going over and laying great stress on many of these agents that have been proven years ago to be detrimental to the tissues instead of beneficial.

Our true conception of what dental therapeutics and therapeutic agents mean in the treatment of teeth is too largely based on the merest smattering of what constitutes normal and abnormal tissue function. It takes long years of study and research to determine what is normal and what is not normal in the tissue, and without a thorough understanding of some of the fundamental principles we are at a loss in applying the remedy that is going to be most useful. Today, if we were asked what is the most important phase of dental therapeutics, we would say undoubtedly that agent or agents that would select the bacterial cell and destroy it without any or very slight injury to the cells of the tissue. We have to consider that an abnormal cell tissue is surrounded by and in close contact with other normal cells, and that the pathological conditions may be influenced more by the normal cells that surround it than by any agent we might apply to prevent its further disintegration, and without an understanding of the normal and abnormal cells, we will always be at a loss to know what agent or what agents we can apply to help the abnormal back to its normal state, and undoubtedly as long as normal tissue cells are in close contact with bacterial cells, the disease process will continue regardless of what agent we may use.

I will, therefore, tell you some of the things that experimentally and clinically have proven of some success in my hands.

Potassium and sodium hydrates are saponifiers of fats and are more or less irritating to all tissues and will produce some very deleterious effects to normal tissue under varied conditions; but in pulp canals, if used judiciously and cautiously, some very good results will follow. Many years ago potassium nitrate was introduced as an agent to be used in putrescent pulps, and today it has many admirers in practice. Many have found the results of its use to be very detrimental. In the majority of cases, I think, those who have used it are not familiar with the reasons why they cannot obtain the best results. The chief reason is that they use it too extravagantly and expect results too quickly, and the after-treatment of the teeth is not always of the very best mechanical character. Therefore, the unfavorable results that many times were attributed to the agent should have been attributed to the mechanical defects in the filling of the root canals.

Again, I want to lay stress on the thorough study of biological chemistry for those who expect to follow up and give to the dental profession a thorough understanding of the particular drug for certain disease processes, for upon this basis rests the understanding of what potassium nitrate will do in a pulp canal. For instance, when this agent comes in contact with decomposing protoplasm, the nitrates are separated, and they have a decided chemical affinity for certain chemical combinations in tissue cell constituents, and they also have an irritating effect when they are separated, and a molecular compound known as nitrogen compound attacks the tissue cells; while in the potassium or sodium hydrate solutions the hydrogen, when separated from the metal, does not have the same irritating effect upon the living cells as the nitrate compounds. These agents are only cleansers. They do not affect the bacteria so wonderfully except in a mechanical way. The clumps of bacteria that are found in pulp canals are so disintegrated that they are not able to reproduce themselves in their mucoid surroundings as they formerly were. It renders them more capable of being washed away and removed from the canal and thoroughly separated from each other, thus rendering them non-prolific in the infected field. After washing out the pulp canal with a ten per cent. solution of sodium or potassium hydrate, a mild disinfectant may be applied, or perhaps I had better say, antiseptic, without doing any great harm to the tissues at the apical end of the root and will have such a restraining influence on bacterial life that it will render the tooth more amenable to filling than it otherwise would.

The presence of the bacillus of pulp gangrene in root canals in large quantities always means that pus will finally be the result of the decomposition of the pulp, usually accompanied by a streptococcus infection of some kind or other, and it is very important that an agent be used in most all cases of this kind that will cause the disintegration of the clumps of bacteria that are found in root canals and even on the surfaces of the teeth. If Dr. D. D. Smith has accomplished anything, which he undoubtedly has, by his method of treatment, it is the fact of mechanically removing those areas of bacteria that inhabit certain portions of the teeth and even on the gingival margins which are constantly infested with large numbers of bacteria.

In pulp canals, after thoroughly cleansing with some mild agent that has, perhaps, only a restraining and dissolution influence on bacteria, antipyrin is one of the agents that I have found most effectual in the after-treatment in the use of these agents. The streptococci and staphylococci are not affected so very much by either potassium or sodium hydrate except in dissolving their mucoid attachment to each other, but the application of antipyrin to their dissolved condition seems to have a wonderful restraining influence on their presence. In pulp canals, where there is a considerable area around the apical end of the root, potassium chlorate is a good wash for such canals, followed by the antipyrin antiseptics.

It has been shown by experimental research that bacteria living or growing in substances rich in proteids are much harder to destroy than bacteria living on a less complex molecular substance. The bacterial cell, when living on strictly proteid agents, will be richer in proteids than one living on a carbohydrate food. Therefore, this may account for the differential understanding between a bacterium that produces fermentation and one that produces destruction of tissue cells. Bacteria that produce toxins or a poisonous process in the tissue cells are usually those that live on at least 65 per cent. of proteid substance as food media. Those bacteria are always rich in the endo-toxins and less rich in the toxins themselves, and it has been found that the endo-toxins are much more poisonous to the tissue cells than are the toxins. Where there is a considerable exudation of tissue cells in the presence of bacteria, we will find that the bacteria and the tissues are more rich in the endo-toxins than they are in the toxins. We can easily see how important it is that we study all the phases of tissue changes to better understand the effects that we desire in the use of a drug, whether it be for its antiseptic or disinfectant effect, or whether it be for the mechanical removal of bacteria. If it were not for the growth of bacteria in pulpless teeth or in tissues surrounding the teeth that are possessed with a facultative, aerobic or anaerobic process, peroxide of hydrogen would undoubtedly prove one of the most effectual agents in use in the mouth as an antiseptic, but many of these bacteria, especially those that grow in the pulp canals and around the necks of teeth, have a faculty of growing either in or out of the presence of the oxygen of the air. Those that have a preference for the oxygen of the air are not in any way affected except mechanically by the application of peroxide of hydrogen, but those that are more inclined to an anaerobic life are profoundly affected by the use of peroxide and of all the agents I have used in the mouth as washes, a one- and two-per cent. solution of peroxide of hydrogen in distilled water will come the nearest to freeing the mouth of bacteria of any or all of the agents that surround the gingivae and interproximal spaces in the mouth, and Dr. Black's normal salt solution, which he has advocated is almost, if not equally, as beneficial in its effect in producing a prophylactic condition, so-called, as peroxide of hydrogen.

The principal excuse I have in offering this rather incomplete discussion of the subject is to impress one important fact, and that is to bring forward and support men who will do profound dental research in therapeutics on a biological basis.

It will be observed that I have reviewed briefly some of the evolutionary processes which our antiseptics and disinfectants have passed through in twenty-five years, and that we have nothing very profound to offer except that we are coming back to the simpler forms of therapeutic agents; that our long discussions of the many and various agents in dental therapeutics have only broadened our scope of observation as to what agent we can best use in all cases. Many phenomena of tissue changes are constantly manifesting themselves in a great number of dissimilar ways; therefore, the more profound the understanding we have of cell life, the better understanding we will have of the agents to be applied in cases of abnormal tissue changes.

I wish to thank many of the members of this Society and the State of Ohio for the many encouraging words and thoughtful consideration that they have manifested for me in my feeble attempt at the researches made and clinical experiments in dental therapeutics.

DISCUSSION.

Dr. Frank Acker, Cleveland, O.: I do not know a good story to open my remarks with, but this suggestion kept running through my head: that Dr. Cook could not have hurt my feelings by giving me the paper in advance, for it would have required too much study.

He is right in line with the best thought of the day in his suggestions to avoid over-treatment. Yet there are certain cases in which over-medication is almost impossible. The Buckley treatment, with formalin, using all necessary safeguards, did well in the hands of careful men, yet has done much injury in less safe hands.

Now, what Dr. Cook's paper amounts to is this: that we have not definite proof that there is a definite remedy for every dental disease. The druggist has his own peculiar, individual attitude toward certain drugs based upon long-time usage or custom. We dentists are simply groping around until we can demonstrate which remedy is best applied to the varied conditions met in daily practice. I think there are some pathological conditions in which chemistry has a very small part, in therapeutic value. Our mental attitude has as much to do with it.

The hint Dr. Cook threw out that inaccessible germs accounted for the persistence of some forms of abscess, so that they appear incurable, indicates a call for some remedy that may be safely forced into these remote quarters; but in the usual run of cases I see no reason why we should not use the formocresol, if we keep it away from the apical foramen of the tooth.

Now the impressive point of the paper is the emphasis laid by Dr. Cook on this: that there is still work of investigation to be done, and that there is now an organ ized body in the dental profession ready to undertake a solution of some of these perplexing problems. I am not enough of a student of bacteriology to understand how Dr. Cook proposes to eliminate the toxins and to break up the nests of the germs, so to speak. Yet I have faith in his promise that it is to be accomplished. I hope that he will work that out to some definite conclusion, and present it in another paper.

DR. J. R. OWENS, Cleveland: I have been greatly interested in the paper. I regret that I have not made scientific research a special branch of study. Nevertheless, I have had considerable practical experience in the line of root-canal treatment.

As to medication, in root canals—many dentists are like a friend of mine who had the idea that the really best physician was the one who came oftenest to see him, and prescribed frequently. So many dentists think it is necessary to medicate root canals daily for weeks to get them ready for filling. With *proper* treatment two to three treatments are quite sufficient. Over-medication impairs the life of the tooth.

Dr. Cook has told us that the dentist needs few remedies. He says that the profession has become confused by the numberless remedies proposed, and that we dentists are using and abusing them and our patients. I am delighted to learn that Dr. Black has come to recognize the saline solutions. These simple remedies, we shall come to see, are the best. What do we use for preservative purposes more frequently than common salt?

In the treatment of abscessed teeth we too often partly cleanse the root-canal, then apply medicaments, and expect them to supplement our half-finished work. The next time the patient comes we cleanse it a little more—like cutting off a dog's head a little at a time beginning at the tail. What is required is thorough cleansing, by instrumentation, the first sitting.

For the preliminary washing out I have used warm water and have followed this with peroxide of hydrogen, carrying it to the apex of the root on a broach around which is twisted a shred of cotton. This is followed with medication of tinc. of iodin, if it is a putrescent pulp, and with beechwood creosote if no decomposition has occurred.

As regards the essential oils—they should be discouraged. I am glad to know that we are growing more rational in our treatments.

DR. H. T. SMITH, Cincinnati: When I asked Dr. Cook today why he had not sent me a copy of his paper he replied: "You would not understand it, anyhow." So I must ask your indulgence while I flounder through the few notes I have been able to make as he read his paper. I feel shut in by my lack of information, somewhat like the old chap who, on his way home, encountered a tree-box around which he circled helplessly, finally appealing to a passerby, "Say, my friend, won't you help me get out? Somebody has closed the gate."

Dr. Cook has confined his attention, in this paper, almost exclusively to root-canal treatment. He mentioned Dr. Black's One-two-three mixture, as being unnecessarily caustic. In root canals where the apical foramen is not enlarged, there is little danger in using powerful medicaments, but in all cases where soft tissues are involved, of course great care must be exercised. Formocresol and other escharotics we all understand should be modified when used in contact with soft tissues. Dr. Buckley so recommends and the method of diluting with oil of cloves is quite simple.

The change which Dr. Cook mentions as to the abandonment of the One-two-three mixture, and the substitution of normal salt solutions, seems to me not to apply to root-canal treatment. Sulphuric acid is still one of our best medicaments. It can be used not only for decalcification but for breaking down pulp tissue. He mentions sodium and potassium hydrates, which are saponifiers, but they are not better than kalium-natrium, which is one of our standbys.

Dr. Hinman, of Atlanta, Georgia, at a recent meeting in Cincinnati, announced that he had abandoned the use of Black's formula, as well as the Buckley compounds of formalin and cresol, substituting white oil of cloves. The antiseptic and penetrative virtue of this is very great.

The use of anti-pyrine as a mild, antiseptic dressing is new to me. I have, however, a profound respect for Dr. Cook's knowledge of the use of drugs, and think his explanation of the actions of toxins and anti-toxins is very interesting. The toxins that are produced in the body are a great mystery to the dentist. There are certain toxins that are beyond the etiological study of the physician. Death from pyæmia, from toxæmia, delirium, accompanied by poisoning—these occur, and the physician is absolutely helpless in facing the symptoms.

Speaking of problems still remaining unsolved: we need more prompt, effectual means for entering root-canals. The calcium phosphate is discouragingly slow. In association with a Cincinnati chemist I have taken up the introduction of sulphuric acid, synthetically, at the mouth of the root-canal, or within the canal, so that it may act in its nascent condition. This problem I had hoped to hear mentioned by Dr. Cook, and perhaps discussed somewhat at length.

Dr. Cook speaks of the growth of bacteria within the body. That, too, is exceedingly interesting—absorbingly so.

I have noted, recently, the use of the carbohydrates as a dressing for wounds. *The American Medical Journal* speaks of powdered glucose, a form of sugar, a solution being made for delicate plastic operations, for burns. It is antiseptic, like a normal solution in its action, is not in any sense caustic, and promotes the formation of granulation-tissue.

DR. C. G. MYERS, Cleveland, O.: I have been listening to such things as these for twenty-five years, and feel like throwing up my hat. For the last twenty-three years of the twenty-five, I have used nothing but water, absolutely nothing else but pure water, for the treatment of nerve-canals. Have filled immediately, regardless of the amount of root infection. I am glad to see that the present trend of thought is according to this. We have gained little in the knowledge of drugs during all these years. The root-canal can be got into perfect condition for immediate root-filling with water alone.

DR. E. BELFORD, Cleveland: I am impressed with a feeling that Dr. Buckley's ideas and his suggestions for treatment have not been correctly stated. There seems to be some misunderstanding as to that. He surely would give you a different impression of his teachings if he were here to speak for himself.

DR. FRANK W. SAGE, Cincinnati: I am by no means prepared to admit Dr. Cook's modest plea that his paper is hardly worth while; it seems to me well worth while. Many years ago Dr. Black called attention to the danger of lowering the vitality of the parts by applying powerful remedies in treating pyorrhea. This, he pointed out, would defeat the purpose we aimed to accomplish.

Of late years we have had several new remedies recommended, some on the ground of their possessing three-fold, ten-fold, the strength of the medicaments formerly employed. It always has seemed to me that was a doubtful sort of recommendation for root-canal or any treatment. Dr. Buckley has given us his formocresol, which in the hands of many has accomplished favorable results. But it has seemed to me that the doctor, while referring to empirical practices in root-treatments commonly used, himself hardly escapes the same thing. He advises diluting one-half, the formocresol, as near approach to the apical foramen is indicated. But how does he know that even that weakened compound will not do mischief, if, by chance, it should pass the root-opening? And he frankly declares the opinion, elsewhere, (*Cosmos*) that a tooth that has once had formaldehyde pass through its foramen is lamed for life.

I do not find his suggestion for placing this mixture in the pulp space, thereby taking the chances of its irritating any living portion of the pulp, appealing to me. Should there be irritation, he recommends home treatments: hot pediluvia, anodynes, alteratives. I prefer to enter, as far as I may, all canals at once, removing all decomposed parts of the pulp, after which it is usually easy to allay pain by simple topical treatment, then later, the entire canal contents may be destroyed and removed.

A patient who has suffered all night, or two or three nights, with a tooth-pulp, should not be sent away under any uncertainty, when once we have exposed the pulp to ready access, for no real objection lies against freely using cleansing broaches, thereby insuring relief, in all but a bare minimum of cases. There are many chances of finding an area of living, inflamed tissue, in connection with the superficial dead, decomposed part of the pulp, and if the application suggested is fairly certain to cause aching, why use it? I prefer to use anodyne topical treatment.

I must confess the method appears to me to have no better recommendation than the ultimate result of affecting a more thorough and lasting sterilizing of the tooth, and that might be as well done after getting rid of the aching pulp, as before.

I have not discussed Dr. Cook's treatment, after all. It is to me new, and I shall enjoy studying the paper closely when it appears in print.

Dr. W. G. Ebersole, Cleveland: I believe the profession suffers more from over-medication than anything else. I believe that disinfectants and antiseptics are responsible for the long, tedious course many simple, uncomplicated cases of tooth-trouble pass through.

I think that Dr. Prinz and other investigators who are to be employed by the National Research Committee will find the elimination of many antiseptics used today to be a first requisite to real advancement. I had the privilege of being a member of the first Dental and Medical class in the study of bacteriology in this city. I came into the medical and the dental profession at a time when bacteriology was being studied most assiduously, and later those who were most enthusiastic came to see the swing of the pendulum away over beyond reason. The destruction of bacteria being deemed of first importance, powerful antiseptics were employed with the result that while the disease-producing cells were being destroyed, the deleterious effect upon animal or tissue cells was manifesting itself in a most alarming manner.

Dr. Cook's paper indicates the present trend toward the happy medium. You may recall how our surgeons were startled and amazed during the recent Russian-Japanese war by the wonderfully successful surgery of the Japanese doctors, practiced on the "little brown men." It is said they used the natural saline solution, many times nothing but water. The astonishing recovery from wounds of the gravest character attracted the attention of the surgeons throughout the world.

Dr. Ira Brown, of this city, once stated that he used distilled water for treating abscesses of teeth. He was probably nearer a rational method of treatment than some of us today.

Dr. Cook (closing): The discussion we have had is pleasing to me, for several reasons: we have been finding germs with our microscopes, and the first thing we thought we should do was to burn them out. We have been introducing for many years, into root-canals, the very agents calculated to foster the enemy we are trying to get rid of. This using of formalin solutions is much as if we were to place a compress on a man's stomach, and then by way of making sure of its being in position, and of its taking effective hold, jumping upon it with a couple of hundred pounds' weight.

Now we get the best effect by employing a weak solution of this remedy I have named, or any other medicine. One speaker told of the use of carbo-hydrates—glucose, a form of sugar. Well, it is the sugar in ham that keeps the micro-organisms from destroying it.

I need not dwell particularly on other points elaborated by various speakers. On the whole, I am glad none of you saw my paper, in advance, for in that case I doubt whether we should have had so good an off-hand discussion. It goes to show some of you had already been thinking along these very lines. I thought Dr. Black and myself were the only members of the profession who had given the matter any attention whatever.

We are constantly being approached by men selling mouth-washes, who are willing to constitute us agents for their nostrums, without our even asking the honor. There are only about thirty micro-organisms of an injurious disposition, but some of them are the dickens when they do get to work. The best treatment is to let the tissues alone, allowing them to resume normal function, for the most part. There are cases where we must use medicaments, of course. The saline solutions will not always accomplish the end we are after. Mechanical or chemical cleansing is the great requisite. It is never the correct thing to take up some quack remedy, because some agent wants to exploit it, for commercial gain. The ordinary engineer knows more about steel or brass than some practicing dentists know about remedies they use daily We need to study more, to know more of physiology, of pathology, of chemistry, than many of us actually do know, in order to apply drugs intelligently.

DENTAL SCHOOL INSPECTION AND DENTAL CLINICS*

BY OTIS B. NESBIT, M.D., VALPARAISO, IND.

IT IS A GREAT PLEASURE to be with you and to note the high character of the papers being presented to your society and the very intelligent discussions of them.

Some of the members of your society are foremost in the oral hygiene movement, and these workers realize that dentistry must be raised above the plane of a mere job—tooth tinkering—and become a profession in fact and truly a branch of the profession of medicine and surgery. The dentists of the past have been busy with repair and removal of offending portions of the oral cavity. With the dawn of higher ideals comes the desire for prophylactic work and the wish to prevent damage, rather than to attempt to repair it. Thus your profession is entering the great humanitarian, preventive medicine work, and the opportunity for service is as great as in any other field. To do this you realize that the principles of oral hygiene must be taught early in life and the proper habits as to kinds of food, how and when to eat it, the care of the mouth and teeth and regular visitation upon the oral surgeon for examination and advice. The acquiring of the habit of being willing to pay for advice is important. To teach these lessons early enough to be of service means that this teaching must begin in the public schools. This brings about the necessity for school dental inspection, which is one of the most important branches of health supervision. The objects must be: *First,* to preserve the teeth for mastication purposes; *second,* to prevent malformation if possible; *third,* to prevent infection of mouth structures and thus spare patient pain, the constant absorption of toxins, the reinfection of himself from harbored infection, and the danger of passing the infections to others.

With these purposes in view dental supervision of school children is justifiable and must be undertaken.

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*A talk before the Indiana State Dental Society, 1913.

Your community will not accept the results of an investigation at a distance. It must have demonstrated to it that 80% to 96% of the children of that community have diseased teeth. In instituting dental inspection, first get the dentists together and make an outline of some things they can agree upon regarding the work, but don't expect them all to live up to it; they won't. Put them on record, anyhow. Next get the superintendent of school interested in the subject and ask him to bring up a half dozen pupils from the fifth or seventh grades and show him their mouths. If he shows an interest and is willing, take the matter up with the school board and get its permission. The work needs no advertising as yet. Get proper blanks, make the examinations quietly; orderly, systematically and aseptically. Make out duplicate mouth records. When finished make report of the results of the examination to the superintendent and teachers and the school board. Then have report published in the papers. Keep the names of the dentists engaged in the work out of the papers. Write up a review on the report and explain the reasons for better care of the mouth, ask the editor to publish it with the report. This article should be unsigned. Get the teachers together and discuss the conditions with them and tell them what to teach the children. Tell the teachers how to clean teeth, etc. Explain the reports and ask them to give the children a little talk before giving out the mouth records. The distribution of some samples of tooth powder about this time is not a bad thing. Now is the time to have a public health meeting and to get some good lecturer like the one you had this afternoon, Dr. George Edwin Hunt, to give a lecture on the subject of Oral Hygiene. Show him the results of the inspection and get the reporters to interview him and he will hand them the "dope" that will put the public "next" to what the work stands for and means. He will "loud pedal" the splendid incubator every cavity may become for scarlet fever, diphtheria, tuberculosis, measles and such diseases, to the reporters. Arrange for the care of at least one poor child in each room, and in this be sure it is not done with a loud blat. If the "big I" has been kept in the background and the *needs* of the *CHILD* pushed well to the foreground, school dental supervision will have been satisfactorily instituted and the community pleased and benefited.

In Valparaiso the first examination was made in 1910-11, when 190 were examined. In 1911-12, 936 were examined. In 1912-13 we succeeded in getting a record of every school child's mouth, 1,123, in the city, which includes the public, Catholic and German schools. At the last examination 4,653 cavities were found, 2,405 were in permanent teeth and 1,416 of these were in six-year-old molars.

In the public schools of the 1,013 examined, between 50 and 60% were receiving fair dental attention. About 15 to 20% are indifferent, though able financially, and 20 to 35% cannot afford to pay for the work. About 25% of the bad mouth conditions are found in those for whom the school authorities are buying books or clothing. This shows the absolute inability of the local dentists to care for this amount of charity and the need of some clinic arrangement for the smaller cities. Our dentists have done much gratuitous work, and have never refused the care of any case sent them by a teacher. I believe the school authorities should equip a dental office in the schools and furnish materials. The dentist can afford without compensation for a time to do the inspection work and give one day a month to cleaning, filling and instructing at the school. After the work is established the dentists should be compensated. The superintendent of schools should pass upon those deserving free aid, and it might be quite generally confined to those who are receiving free books or clothing because of not having means.

In some rooms in our schools the teachers make an honor roll for those having good teeth and write the names on the blackboard or on large sheets of paper. As fast as pupils bring slips from a dentist saying their work has been finished, their names are added. Some teachers get over 70% of their pupils to get their mouths put in order during the year.

Our dentists take great interest in this work. One keeps a list of all the little patients and writes them a note when they fail to keep their appointments. When this same doctor has put a child's mouth in order he asks him to return for examination in three months, and tells him if he forgets he will send him word, and this he does.

An interested and united dental profession can be a very busy and useful one in cleaning up any community.

FORTY-EIGHTH CONVENTION OHIO STATE DENTAL SOCIETY AT TOLEDO

HEALTH AND SCIENCE CONFERENCE

(Continued from page 73, January Summary)

Dr. Price: A few years ago, and not many years ago, a group of French scientists came to this country, away across the ocean, and across this land, and wandered over to the old University of Michigan to the old Medical Department, in order that they might visit the rooms, if they still were left, where one of those loyal sons of that institution had taken the virus of the rattlesnake in experimenting to try and if possible work out some resistance for the human body against disease, and thereby laid the foundation for modern preventive medicine by serum therapy, and I want to say that that spirit that pervaded Dr. Sewell in those researches is the keynote of that institution. Those who know it and know its men know that they could go and take salaries from three to five or ten times what they get there if they would go out into commercial enterprises. And yet they stay, because they love that work; they love to help to unlock the doors, and there is one man who is typical of that institution, who represents it as being filled with that spirit of self-sacrifice and devotion and ability, and that is the Dean, Dr. Victor C. Vaughan. And when I tell you that next to my parents and my family comes my profession, and then those dear professors whom I love, you will forgive me for saying that I love Dr. Vaughan. If I have any of the spirit, the vision in any measure at all, it has been given in large part by Dr. Vaughan and his colleagues. Dr. Vaughan will now address us on the subject, "How Dental Infections Reach Other Organs and Tissues." (Applause.)

HOW DENTAL INFECTIONS REACH OTHER ORGANS AND TISSUES.

BY VICTOR C. VAUGHAN, M.D.

DEAN OF THE MEDICAL DEPARTMENT, UNIVERSITY OF MICHIGAN, AND PRESIDENT-ELECT
OF THE AMERICAN MEDICAL ASSOCIATION

It is a very difficult thing, Mr. Chairman and Gentlemen, to speak on a scientific subject after dinner—difficult for the speaker and difficult for the hearer. The subject that has been assigned to me is too big for me to do anything more than to cast a glance at it. The whole theory concerning the methods of infection has been undergoing a rapid and a marked change within the past two or three years, and I can hope to give you only a slight and imperfect review. There are two things concerned in infection—the virus, which is generally a bacterium, and the body cell. A virus can grow only by means of ferments which it produces, and by which it splits up the food within its reach; that is true of every living thing. There cannot be any question about that. Most bacteria cannot feed upon the tissues of the human body, of the animal body, and that is one reason why most of the bacteria are non-pathogenic. On the other hand, the cells of the body furnish ferments, and most bacteria are destroyed by the ferments furnished by the cells of the body. So, there are two reasons why most bacteria are not pathogenic One is, they cannot feed upon the body, and the other is, that the body cells feed upon them, and digest them when they find their way into the body, long before they have time to multiply. These two facts determine whether or not a given micro-organism is pathogenic or non-pathogenic. When we drink water containing the typhoid bacillus, which is a pathogenic organism, we do not have typhoid fever the day we drink the water nor tomorrow. It is about ten days before we develop typhoid fever. During that time this organism is multiplying in the body with enormous rapidity—thousands and millions every day. This is known as the period of incubation. It is not characterized by any clinical signs or symptoms. The individual feels quite as well during the period of incubation as he has felt at any time. Indeed, it is often remarked that people just before they come down with an infection, which means during the period of incubation, are feeling unusually well. It is not, therefore, the growth and multiplication of the typhoid bacillus in the body which causes the symptoms of typhoid fever. That we can set down as positively demonstrated. What is true of typhoid fever is true of every other infecting organism. After a period of from six to ten days, during which the individual is harboring these micro-organisms, the body cells learn how to pour out a new ferment, which destroys the typhoid bacilli. When this begins, then the symptoms of the disease begin. The symptoms of the disease, therefore, are due to the destruction of the invading organism by the body cells. During the period of incubation the micro-organisms which have invaded the body furnish the ferment. The tissues of the body, and especially the soluble protein substances in the body, constitute the food of the invading organism. The invading organism multiplies. There is no poison set free and there are no symptoms. It is not until the body becomes sensitized, as you may say, to the invading organism, and begins to destroy it, break it up, that the disease begins. Then the body cells furnish the ferment. The invading micro-organism is the thing acted upon. The process is a destructive one. A poison is set free, symptoms of the disease appear, and life is in danger. This is the new way in which we look upon infection. It is quite different from the old way in which we supposed that disease, and especially the lesions of disease, are caused by the invading organism feeding upon and eating the tissues. Now we have learned a great many things recently, and one is that the micro-organism may change by gradually changing the environment and the food which it has; and an organism which is mildly pathogenic, or probably not pathogenic at all, may become highly pathogenic; that is, when placed under certain conditions it learns, and it does so very quickly, how to feed upon the proteins of the human body. This has been exemplified in the splendid work done by Rosenow, of Chicago, recently on different varieties of streptococcus. They undergo radical changes so far as their pathogenicity is concerned, and from relatively harmless organisms they become highly pathogenic. Then we have learned other things as well. Whenever a foreign protein is introduced into the animal body, whether it be living or dead, it has its predilection place in which it accumulates. Introduce the tubercular bacillus into the body anywhere, under the skin, into the alimentary canal, or wherever we please, and it is prone to accumulate in the pulmonary tissue. The pneumococcus does the same thing. The typhoid bacillus accumulates in the spleen and in the mesentery glands; the virus of the exanthematous diseases accumulates in the skin and in the walls of the alimentary canal, and it is now pretty well believed that in every infectious disease the poison that kills is the protein poison. The child that dies from typhoid fever and the one that dies from pneumonia and the one that dies from scarlet fever, or whatever you please, dies from the same poison. The specificity is not in the poison that is formed, because it is the same, but it is in the ferment which is produced, and in typhoid fever the ferment splits up the typhoid bacillus and no other. And in a tubercular infection the tubercular bacillus is split up by the ferment, and no other, and so on. The specificity is not in the poison that kills, but in the ferment which splits up the invading organism, and, of course, this is determined by the specificity of the invading organism. Now, wherever you introduce bacteria into the body, some will accumulate in one place in preference to others, and others in other places, and certain organisms accumulate in the skin and some in the intestinal walls and some in the periosteum and some in one tissue and some in another. So that infection through the mouth need not necessarily be a direct infection, but it may be through the blood and these organisms may find their predilection place for growth and development in the tissues of the mouth. Another thing that we have learned recently is that every protein substance contains a poisonous constituent. Egg white contains just as much of a poison and just the same kind of a poison, in fact, the same poison, that the typhoid bacillus contains; and if egg white could grow and multiply in the animal body, it would be just as dangerous to prick your finger with a needle moistened with egg white as it would be to prick it with a tetanus germ. Every protein contains a poison. Another thing that we have learned is that if you accumulate in any part of your body in any way enough pathogenic germs, it does not matter whether they are dead or alive; they are harmful. You can throw into the abdominal cavity of an animal typhoid bacilli, dead or alive; you can thrown in a non-pathogenic germ, dead or alive, it does not matter which; and if you throw in enough of it, it will kill the animal. In fact, some non-pathogenic organisms, such as the progidiosus, for instance, furnish a larger amount of poison than the most deadly infectious organism, such as the anthrax bacillus. The infecting nature of the germ depends upon its growth in the body, but dead germ cells, as well as live germs, non-pathogenic as well as pathogenic germs, are harmful. Therefore, the dentist should know that it is well to keep every kind of bacteria from growing and multiplying in the mouth and accumulating about the teeth and between the teeth and around the gums, etc., because sooner or later they are split up, poisons are set free, the vitality of the tissue is reduced, and other organisms, or those themselves, may become pathogenic. This is the explanation undoubtedly—I wish I had time to go further into it—of the rapidity with which some germs slightly pathogenic, or probably not under all conditions pathogenic at all, become highly pathogenic. They adapt themselves to the condition under which they grow; and not only should the dentist know, and he does know, that not only bacteria accumulating in the mouth, but the debris of food, any infection, dead tissue of any kind, anything which accumulates in the mouth which is protein in character, and which undergoes decomposition, is harmful to the tissues. You can throw dead germs into the peritoneal cavity and cause peritonitis, just as well as living germs. In fact, if you throw enough dead germs in, they will cause death much sooner than the living germs, because the living germs resist decomposition by the ferments of the body, while the dead germs have no resistance; they are split up rapidly, the poison is set free, and the ill effects result. I want to impress upon you, then, that so far as the injury to the mouth and other parts of the alimentary canal is concerned, whether a germ is pathogenic or not is not of all importance. Of course, the more highly pathogenic germs will get into the tissues and grow and multiply, but the accumulation of any kind of protein material, whether it is dead or alive, whether pathogenic or non-pathogenic, in the mouth and adjacent cavities, is injurious to the tissue, and even the tissue itself that undergoes fermentative changes, even the tissues of our own body when undergoing fermentative changes, poisons are set free and injury to the adjacent tissue results. Every protein contains a poison. We are recognizing the fact that bacteria do not play every part in infectious diseases, or in all diseases at least. I suppose to speak of an infectious disease we would imply a living organism. But all proteins contain a poison, and whether the protein is living or dead, when it goes into the body and gets into the tissue, it is harmful, it is split up and poisons are set free. Then again, we have learned a very interesting thing—and I thought last night in Dr. Price's talk, that we are just beginning to understand that disease may be caused by the absence of certain constituents in the food. I was in New Orleans a few days ago, and I was very much interested in the work of Wellman, Bass and others, work being done in Beri-beri, experimental work they are carrying on with fowls. They have four different protein substances. If you feed a chicken or some other fowl exclusively on one of these for twenty days, it will develop this disease; if you feed it exclusively with No. 2, it will, after a period—not exactly the same period, but after a certain period—develop the disease. If you feed it exclusively with No. 3 or No. 4, it will, after a certain time, develop the disease. If you feed it with all four at one time, it remains perfectly well. The only explanation of that, apparently, is this, that there is absent from each one of those some one thing which is necessary to the health of that fowl, not the same thing, so that when you feed it all four it gets every necessary constituent. Now, my friend from Yale, Dr. Chittenden, and some others, have gone wild on this carbohydrate feeding and cutting down the proteins, and so on. I believe that there is as much harm coming from over-carbohydrate feeding as there is from over-protein feeding and that under-protein feeding, and especially with the right kind of protein, is likely to lead to all kinds of deformities and malnutrition in various parts of the body. It is impossible to speak with absolute certainty about this matter, but we are recognizing from the work of Osborne and Mendel and Wellman, and a whole host of others, that the question of feeding is a matter of great importance in the development of osseous and other tissues, and that we cannot cut down our protein too much, and that we must have more or less variety of proteins in our food. I wish I had time to go more deeply into the subject, but I think I have given you the gist.

I want to say that it is with the greatest pleasure that I have attended these meetings, and have listened to the papers, especially the one by Dr. Price last night, and I want to congratulate the dental profession of Ohio and the dental profession of this whole country upon the work that you are beginning to do. The medical profession and the dental profession are in fact one. We, of the American Medical Association with a much larger membership, of course, are spending $70,000 a year out of our earnings, fifty thousand doctors in this country each contributing his $5, and we are spending out of what we earn $70,000 a year, trying to teach the people of the United States how not to be sick. (Applause). I do not believe the world has ever seen anything like it. Only a few days ago I was at a meeting of the Board of Trustees, and I might say that the American Medical Association with its various publications makes a gross earning each year of about half a million dollars. The net earning is about $120,000. We are setting aside $50,000 a year for advancement, improvement, and expansion, and we are spending the balance of it in trying to teach the people of the United States how to avoid sickness. (Applause).

Years ago we had in Michigan a Governor who was noted for his illiteracy, and I remember of hearing him at that time, when he presided at a meeting of the American Public Health Association in Detroit; he referred to the fact that physicians were there from all over the country, trying to devise means through which sickness might be prevented, and he said, "if during my official career I should be called upon to preside over a meeting of lawyers, met for the purpose of preventing litigation, then I would say, with Simeon of old, 'Lord, let Thy servant depart in peace, for my eyes hath seen thy salvation.' " I think if the old Governor were alive today, he would begin to see the lawyers coming around to do as the doctors are doing. The lawyer has been a little slow to take up this altruistic work, but he is coming to it. I sat and chafed one hot summer day in Washington, where I heard Brewer, of the United States Supreme Court, uphold the decision of the United States Supreme Court concerning the bakery law in New York. The City of New York passed rules and regulations which should control every bakery in the city; they should be hygienic; and the Supreme Court of the United States decided that the people of New York had no right to interfere with individual property, and that it did not make any difference whether a baker wanted to run a sanitary or an unsanitary place; that people need not work in them, unless they wanted to; and people need not eat the bread from the bakery unless they wanted to. Now he is dead, and I think most lawyers that belong to his class are dying off, and even among the lawyers we are getting people with progressive ideas. A lawyer, you know, is always hunting for a precedent; he wants to find something that somebody did a hundred years ago that will uphold him. He does not realize, or has not realized until recently, that the world is moving, and that the conditions which existed one hundred years ago do not apply now. In conclusion, I want to say that as I go up and down this country, one of the dearest, most pleasant things to me is to find my old students enthused with the scientific spirit and doing research work. For many years I have been trying to do such work in my humble way. I have often had to pay my own assistants, and to furnish my own apparatus, and give my own time. There has been a joke about it in our family for a great many years. I have, as some of you may know, done a great deal of expert work in medical legal cases, and sometimes I have gotten pretty big fees, and when I have hired a young man to assist me in my scientific work, or I have bought a new piece of apparatus, or something of that kind, Mrs. Vaughn has said, "Do you really think you can afford it?" I said, "The Lord will be good to us; he always has been. Some man will kill his wife, or some wife will kill her husband, and I will get an expert fee, and that will pay for all of it." (Laughter).

It is a pleasure now to note that wealthy men are giving great amounts of money for research work, that states are doing it, that the United States Government is doing more or less of it. Do you know that, since 1901, with the crusade that has been made by the medical and dental professions largely, 200,000 less people have died of tuberculosis than would have died had the same rate of death that held in 1901 continued? (Applause). Two hundred thousand less deaths since 1901, than would have occurred had the same rate of deaths continued! From 1882 up to 1910 the deaths from tuberculosis in the United States have decreased fifty per cent. Now that doesn't mean that we will get rid of the other fifty per cent. as easily as we have the first. There are certain plain things to do, don't you see, easy things to do, and those things have been done, or are being done, and the result is this great reduction, but in order to make a greater reduction, we have got to do more things, and I want to go on record here, as I am going on record everywhere, that the only thing that is going to relieve the world of unnecessary disease is the compulsory examination of every man, woman and child, by both the doctor and the dentist, at least once every year. (Applause). People should go to the doctor and to the dentist and be examined not for the purpose of curing an ill, but for preventing disease. I met an old friend of mine the other day, a doctor, and he told me a pathetic story. He said that about two years ago he learned that the daughter of an old friend, a client of his, a girl nineteen years of age, was engaged to a man whom he knew to be a syphilitic and a rake. He had brought into this world every one of the five children of this old friend. He had a parental love for every one of them. One of the boys bore his name. When he learned this, in a spirit of altruism, with a heart almost broken, he went to this family, to the father and mother, and made a plea that they would save their daughter—*their* daughter, not his—that they would save their daughter. Almost rudely, he was dismissed from the house. He was told that that was none of his business, and the mother was especially hard upon him. "Of course," she said, "This young man has sown his wild oats, but he is rich; he moves in the best society." And the old doctor, as I say, was rudely dismissed from his friend's house. The marriage took place, and this day that I happened to meet the old doctor, he said that early that morning, for the first time, he was again called to that house.

This young woman who had married this rake, when she felt the pains of maternity coming upon her, demanded her old friend, and he had that morning delivered her of a syphilitic child, and he said, "How long before parents will cease sacrificing their daughters on account of riches?"

Gentlemen, we have before us, the medical and the dental professions especially, and all other good men, the greatest work that man ever felt called upon to do, and that is to rid our race of the charge of ignorance and superstition. In this way, and in this way only, can the better men be produced, and our professions are on the firing line. I think there are three professions which must move hand in hand in all this good work—the engineer, who must clean up, give us good water, dispose of our waste material, etc.; the dentist and the doctor, and it matters not what opposition we have, we must go forward and carry on this great work, because, if there is anything in this world worth doing, it is the elevation of the human race, and we are in the van and in the thick of it, and we are not working for money; we are working for the good of mankind. I thank you. (Applause).

(To be continued)

Indiana State Board of Dental Examiners

The registration of the dentists under the new Indiana law is well under way. The new law calls for the annual registration of all dentists who have ever been registered in Indiana, whether they are practicing in the state or not, if they wish to retain the right to practice at any future time.

Section 9 provides as the penalty for failure to renew within a period of three months after Dec. 31st of each year, the cancellation of said license. Provided that any license thus cancelled may be restored by the board upon the payment of a fee of $5.00, if paid within one year after such cancellation. There is no provision for the restoration of a license thus cancelled after a period of one year.

Dentists eligible to register should immediately send for application blanks to

F. R. Henshaw, *Sec'y. and Treas.,*
507-8 Pythian Bldg., Indianapolis, Indiana.

Washington State Board of Dental Examiners

The Washington State Board of Dental Examiners meets at Seattle in May, 1914. For further information address

Pascal W. Yearsley, D. D. S., *President.*
Spokane, Wash.
R. L. Moak, D. D. S., *Secretary-Treasurer,*
Montesano, Wash.

BUSINESS·SUGGESTIONS

Our readers are urged to send business suggestions for this department that there may be an exchange of ideas that will be mutually beneficial. Send all contributions to the editor,

L. P. BETHEL, 195 SIXTEENTH AVE., COLUMBUS, OHIO.

THE BUSINESS SIDE OF DENTISTRY

BY "A BUSINESS MAN"

THE DENTIST'S FEES.

The dentist is entitled to a good fee by every rule of the game. He has a certain investment in his education; he has equipped and must maintain a comparatively expensive office; he is ministering to the need of suffering humanity by preserving their teeth and thereby insuring them against future suffering; and he is entitled to and should have adequate returns for the time, thought and money spent in his preparation and present maintenance.

Of course not all dentists can get the same fee for the same work, but one's fees should be governed by his investment, his current expenses, his location, the class of patients with whom he deals and their ability to pay. In all cases, unless a purely charitable case, the dentist should make a good, legitimate profit on his work. He should not be afraid to name a fee which will enable him to put in his very best in thought, time and materials, doing the work conscientiously, the only way in which work should be done and the way his patient may reasonably expect it to be done. When a patient is thoroughly satisfied with the results, he very soon forgets the cost; but when the results are not what they should be through the dentist slighting the work in any way, the fee, no matter how small, is exorbitant. The reputation for doing excellent work, even though your prices may be higher than some others, is much more enviable than that of doing the work not so well but more cheaply. Having done one's work conscientiously the fee should be adequate.

Few dentists seem to have a proper conception of what their investment really is. They do not consider that their preparation as well as their equipment and all current expenses should be compensated for. Any equipment, no matter how good, will deteriorate and will eventually have to be replaced. Very much has been written and much more could be said along this line. Every successful merchant, manufacturer or banker considers in his accounting that his business must pay a certain percentage each year for replacements. The dentist's fees should also provide for a certain percentage for this purpose and this together with current expenses, a profit on his work and a salary to himself, should be a basis for determining what his fees shall be.

THE DENTIST'S PROFITS.

The profit that any business will make for a man is the difference between the cost and the price at which the sale is made. From the profits must be deducted all expenses of every sort, including interest on the investment, depreciation, salary, insurance, rent, light, heat, telephone and a multitude of other items, varying according to the man and the requirements of his business. It therefore behooves a man to make the most of the opportunities afforded for saving. To a dentist there are various means by which he may accomplish a saving both in the manner of buying his goods and in the manner of paying his bills.

A great saving is made by buying staple goods in quantities and the increased profits are out of proportion to the expense involved by the investment.

Another means of saving money in considerable amounts is to avail one's self of the deposit plan which your dealer will be glad to talk over with you. By this plan your dealer will accept $95.00, giving you credit for $100, and against this deposit may be charged any goods that may be wanted and at times deliveries are made. The only exceptions to this are precious metals at ounce rates. By a little figuring one can determine the amount of the annual saving by this arrangement. Assuming the average investment to be one-half the amount invested in the beginning, namely, $47.50, and that one's purchases were $500.00 a year, the net annual saving is over fifty per cent. of the investment, and larger or smaller annual purchases would net a proportionately larger or smaller annual saving.

If you are on intimate terms with a good banker (and you surely ought to be) and have any question of the desirability of this arrangement, consult him and I am very sure he will advise you to avail yourself of this privilege.

THE DENTIST'S PURCHASES.

It is good business always to purchase only good goods and from reputable dealers. Don't be deceived with the thought that because an article costs less, it is cheaper, for very often it is decidedly more expensive. While good goods may cost a trifle more at the outset they are likely to be cheaper in the end. Besides this, the dentist has the satisfaction of knowing that he conscientiously tries to furnish the best.

The patient who employs the services of a dentist is justified in the belief that the dentist will put in the very best of thought and materials at his command. Therefore, confine your purchases to those houses whose reputations are such that you can, with perfect safety, rely on them to stand back of their goods in every way. Concede to the dealer the right to make a legitimate profit on the goods he sells, for there is scarcely a line of business in existence where the investment is so great and the details so exacting as in the dental supply business. Coupled with this is the further fact that the dental dealer's profits are not extensive. His clientele is not numerous, and he has to practice rigid economy and the most careful thought in order to make his business a profitable one.

(To be continued)

THE BUSINESS SIDE OF DENTISTRY*

BY HOMER C. BROWN, D.D.S., COLUMBUS, OHIO

SOME MONTHS AGO when your President invited me to meet with you on this date, and either present a paper or informally discuss "The Business Side of Dentistry," I was at first prompted to decline and afterwards wished I had, when I was informed that a number of your members recently took a course of lectures upon this subject, which no doubt qualifies them to instruct me rather than the reverse. However, my interest in your society and my willingness to render any possible service persuaded me to accept and I trust that some benefit may result from the discussion of this important subject, which, unfortunately, is much neglected.

It would seem best in the beginning that we should recognize three things as follows: *First*, that there should be some business principles employed in the practice of dentistry. *Second*, granting the first, we are forced to admit that most dentists conducting their practice as though this should in no way apply to them. *Third*, that in order to improve conditions, it will be necessary to stimulate a discussion of the subject to the end that some distinct benefit will result therefrom.

Please do not understand that I am going to advocate that our professional traditions or our ethical standards be waived or in any way lowered, but I am impressed with the fact that when we adopt some more positive business methods, of present-day vintage, we will very positively raise ourselves in the eyes of the public, increase our self-respect and make material provision for the "rainy day", which may sooner or later come to many of us.

"Nothing succeeds like success," is an old adage and applicable in this connection. This is exemplified when we see a progressive up-to-date and successful person, in any vocation showing ample evidence of prosperity and receiving general approbation. This is evidenced in many ways as the vast majority respect a prosperous man, follow a leader, applaud a victor and worship a hero, but there are modified degrees in prosperity, leadership, victory and heroism. Unfortunately many worthy contestants fail to reach the high position to which their efforts entitle them, but there is no dishonor in being on the losing side, for ofttimes right and justice may be overcome by some unfortunate development which cannot be foreseen and controlled. Of course, we must always expect a liberal amount of "knocking" from a certain class of selfish and disgruntled individuals, who frequently go to supply variety in the human family, but the fact that the "anvil chorus" is active generally indicates that some one has done something worth while.

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*Read before the Miami Valley Dental Society, Dayton, O., Oct., 1913.

In order to create more interest in this side of our professional life, we should encourage the discussion of this subject at our society meetings and in our journals. It is also quite important that the dental colleges revise their curriculæ so as to include a course in Economics, Ethics and Practice. Some colleges possibly have, at this time, some such abbreviated course, but a carefully worked-out course of study should be universally adopted and this, in my opinion, would be a decided benefit to all.

A large per cent. of the students matriculating in dental colleges today are probably no exception to some of us who entered years ago—that is, deficient in many ways, business training undoubtedly being one of these. Recalling my college experience and seven years' service as a member of the Ohio State Dental Board—six years of this as Secretary—together with my active interest in our dental organizations, forces me to admit some of the shortcomings of our profession and I will gladly render every possible assistance in correcting these and in encouraging others to give due consideration to such important phases of our work.

By emphasizing the business side of our profession I do not want to be understood as advising, in any way, the neglect of any part of our professional or ethical sides, but on the contrary, I would encourage everything that tends to promote further advancement and, if I mistake not, nothing will stimulate this more than to instill a reasonable amount of business principles into the lethargic business side of our professional life. A strictly successful practice of dentistry, in its fullest meaning, is one where the professional side and the business side have been developed in harmony; and this is quite possible, thoroughly ethical and highly commendable.

Because some conduct their practice with the financial returns uppermost in their minds, this should not in any way handicap others from discussing the subject. We admit some are in the profession having only the dollar in view and have financially prospered. Others have conducted a full, active, ethical practice and rendered excellent service, but in declining years they have been forced to recognize that in a strict business sense they have been failures. If forced to accept either condition, I would prefer the latter, arriving at this conclusion as I see things now, but who knows what changes may come under the most trying and adverse conditions!

It is true that success in life does not always depend upon the amount of money a person has accumulated, but unfortunately good and faithful service, in former years, is seldom accepted at face value in providing the necessaries of life.

Usually there is distinct competition in the commercial world which is generally based upon definite principles, including original investment. cost of production, overhead expense and supply and demand. In the professional world the term "competitor" should be eliminated and "confrere" or "fellow practitioner" substituted, but it is important that the professional man should recognize that the time and expense in preparing for practice, as well as the equipment in the establishing of an office, should be considered as an original investment. This should be done on the same basis that a business concern would consider the constructing and equipping of a plant for manufacturing purposes as such an investment.

Therefore, a dentist should not only consider what he, or some one, actually spent on his dental education, but remember that this required at least three years of time when the earning ability should be fairly remunerative; also that the office equipment should be counted in this original investment. The total of this expense would probably vary from $3,500 to $5,000, and sometimes more, according to the tastes and habits of the individual. All these items should be considered as an original investment and, from a business point of view, should at least show a reasonable rate of interest. Add to this the overhead expense, such as rent, supplies, office assistant, etc., as well as what a person of such training, standing and ambition should hope to earn as a salary. After all this is tabulated, it becomes apparent that the first $1,200 to $2,000 received from the annual practice of the average dentist, should be considered as interest on the original investment and office expenses.

The items enumerated should rightfully be considered in determining the question of fees and any other system, in arriving at this, is certainly lacking of business principles. It too frequently happens that no thought is given to this original investment, and sometimes little if any consideration is given to the overhead expense, but anything so unbusinesslike would only indicate that under the law of averages, the individual will no doubt be more or less of a business failure. Probably the most satisfactory way to determine the question of fees, in a just and equitable manner to all, would be to take the totals of the items heretofore mentioned and the number of hours which should form a yearly practice and work this out on an hourly fee basis. Of course, due allowance should be made for vacations, holidays and lost time; also, it is always advisable to add a liberal allowance, say at least 25 per cent., for emergencies which cannot be definitely enumerated, but which are certain to appear.

After these details have been adjusted, it is quite important to adopt some definite business principles, which should apply to the method of conducting a practice, such as office location and equipment, with particular attention given to light and appearance. A definite system of appointments, records, rendering statements and collecting accounts should be established and the employment of a lady office assistant will be of distinct advantage. Last, but not least, it is important that all appointments and obligations, regardless of character, be met promptly and that the individual conduct and habits be such as to attract rather than the reverse. By being punctual with your appointments and prompt in paying your bills, you will establish a precedent which will be of benefit in many ways. My several years of varied official experience, which put me in close touch with the dental profession throughout the country, prompts me to say that indifference as to professional progress and negligence in correspondence, or any particular duty which may be assigned to the average dentist, is difficult to understand and is a distinct handicap in professional advancement. Indifference and negligence are inexcusable, and courtesy alone should prompt any person to reply to a letter requesting information, especially so when it relates to a subject in which a common interest should exist.

Due regard to these details will advance the interest of the individual and reflect credit upon the profession generally. Of course, one must appreciate that local conditions and environment may somewhat regulate the carrying out of such a standard, but it should be clearly understood that the nearer we approach what may be accepted as a high standard or ideal conditions, the more nearly have we discharged our duty to ourselves and our profession.

There is another fact which I feel justified in mentioning in this connection; that is, most professional men are considered "easy marks" when it comes to parting with their "hard earned money." Propositions, with a beautifully pictured future, are submitted from time to time, which require only a limited payment in order to get in on the "ground floor," but frequently a second mortgage is taken upon the life of the investor for the balance. These rare opportunities for profitable investments are generally located so far away that you never have a chance to make an early personal investigation and after a time the desire to do this may pass away, or even the mention of the subject may be more or less nauseating.

It should not require any very strong argument to show that a dentist is not in a position to be posted or keep in close touch with many of the real live business opportunities, and it seldom occurs that any very attractive proposition requires personal solicitation of those having only limited capital to invest. Further, a dentist is not in the best position to readily recoup losses if they come; therefore, after taking all these things into consideration, and under ordinary conditions, it would seem advisable to play safe and invest any surplus earnings in real estate, life insurance, first mortgages and good bonds. Such investments may not keep pace with some of the "get-rich-quick schemes," but the chances of being credited with possessing some business qualifications, even though you are a professional man, are greatly increased.

Three things are quite important to consider when contemplating making an investment, as follows: Safety, profit and liquidation. Anything that does not measure up to such requirements should only be accepted when you feel you can take long chances in order to make good profits, if all goes well, and where the loss of the amount invested will not work a hardship upon anyone.

185 E. State St.

CORRESPONDENCE

THE TRUE PHILOSOPHY OF MASTICATION AND INSALIVATION

A REJOINDER

BY MERRILL HOPKINSON, D.C.D., A.M., M.D.
PROFESSOR OF ORAL HYGIENE, UNIVERSITY OF MARYLAND

Dear Mr. Editor:

May I ask you to grant me a little additional space for a final statement, regarding the very interesting discussion between the writer and George M. Niles, M. D., upon the above subject?

A somewhat hyper-calorific epistle, which I received from Dr. Niles shortly after my article appeared in the October number of The Dental Summary, announced that he would answer me and make me "feel like thirty cents," indicating that I had put my pen into a weak spot in his armor. I awaited his reply with intense interest, anticipating a novel sensation.

His paper in the December issue fails utterly in its design, and I am thus deprived of a new impression, and he loses caste as a self-appointed prophet.

I am constrained to feel that my "perfervid communication" had a salutary effect upon the gentleman, for, as I read his so-called reply, announcing certain "basic principles," I find he has enunciated a scheme which can be readily subscribed to by almost all men interested in the subject of mastication and insalivation. Indeed, it would almost seem as though he had read my thoughts in preparing the aforesaid list of "seven basic principles."

Having put aside his frivolous attitude, his reference to lack of mastication by carnivora and reptilia as one of his arguments against this practice in the human being, and other weak and equally untenable premises, I am prepared to say "amen!" to his alleged reply.

The above sketch, ladies and gentlemen, might be entitled "Why Men Take Pills!"

It is an act done daily by a cast of men which embraces a large portion of our downtown following. The scene, as you see, is laid in a one-arm, quick-lunch room. The villain in the piece cannot be seen, but it is that great bugbear Time. With his great scythe hanging threateningly over the heads of the rest of the cast he spurs them on to the destruction path of indigestion!

The hero of this act is also unseen. It is Good Business. He is the god to which the whole cast bows and acknowledges his power. The actors that you see in the above sketch are but the puppets of the villain and the hero. Spurred on by one and bowing to the other, they rush madly along the path that leads to—pills!

As a general rule but 15 minutes are allowed themselves by these busy men to grasp coffee, sandwich and the inevitable pie from the counter of the quick lunch, and to swallow with as little premastication as possible. Shades of Fletcherists, the pity of it!

But as this man of haste carries his luncheon to the one arm of a nearby chair he sees sitting next a man he has been endeavoring to catch all morning by 'phone. Such an opportunity to discuss that deal in which both are interested cannot be wasted. Bowing to Good Business and spurred on by Time he draws close to his fellow-puppet, and in between bites of pie and swallows of coffee they transact their business in the allotted 15 minutes.

Ah, friends, it is a sad picture to all followers of Fletcher and New Thought! The placid calm, both outside and in, that should accompany all acts of this kind is absent.

If any of your readers is sufficiently interested in Dr. Niles' original paper, that which called forth my article in THE DENTAL SUMMARY of

October, and would care to read it, it can be found in *The Journal of the American Medical Association*, March 29, 1913, page 979. A comparison of the original with his recent utterance in the December SUMMARY, will, I am sure, prove interesting. One could scarcely have the temerity to claim the "mental horizon" of so talented a man as Dr. Niles, but in my simple and halting manner, I have endeavored to look beyond the first three inches of the alimentary canal, being careful, however, with other mentally deficient physicians, to accord it its proper place in the economy of digestion. Some day, I hope, I may reach the lesser foothills of his wisdom and erudition. I am sorry I cannot gratify his illy-disguised hope, and place myself in the category of the "unknown," as quoted by him and the wily Beelzebub.

I very highly esteem the ability of Einhorn, Kemp and Lockwood, and their testimony naturally carries weight. In the present discussion the writer does not regard them as presiding in the court of last resort, with Dr. Niles as chief judge.

A more intimate and comprehensive understanding of the mouth, its contents and functions, all grievously neglected by the great lay masses of mankind, and the majority of scientific men would be of infinite value to the above distinguished quartet.

Let us hope that the day is not far distant when the widely reaching effects of our present oral hygiene propaganda will so grip the hearts and minds of professional men and laymen alike, that, whether we are disciples of advanced Fletcherism or not, we shall all be fully able to apprehend the grave necessity for properly prolonged mastication and insalivation, and never be guilty, by word or deed, of doing aught which might retard the widest dissemination of its beneficent teachings.

413 Professional Building, Baltimore, Md.

Note!

Dr. Lyons advises that in his article on "The Impacted Lower Third Molar," in January SUMMARY Fig. 2, page 3, in text, should read Fig. 3; Fig. 3, page 3, in text, should read Fig. 5, and Fig. 4, top of page 4, in text, should read Fig. 5. The word "restoration" under Fig. 4 should be "resorption."

CORRECTION

In my article on "The Three-Point Contact" in the December SUMMARY there is an unfortunate omission as follows:

In the third paragraph it should read: "But with the numerous flat narrow surfaces *of the lower jaw*," etc. L. P. HASKELL.

EDITORIAL

A Great Dental Meeting

Preparations are being made for the "golden anniversary" meeting of the Illinois State Dental Society to be held in Chicago, March 23, 24, 25 and 26, 1914, and if any of our readers want to attend a meeting that is worth while this is the meeting to attend.

Illinois has many prominent and progressive dentists whose achievements have won for them national and international recognition and they propose by combined effort to make this the biggest and best dental meeting ever held. And when these Illinois men start to do things something is accomplished.

They propose to devote three sessions only to the literary part of the program, the subjects, "Illinois State Dental Society," "Operative Dentistry," and "Prosthetic Dentistry" receiving consideration and the balance of the meeting will be devoted to clinics. The meeting will in reality be a "clinical congress."

On the first day it is intended to have representative clinicians from every state in the Union as well as from every province of Canada, and many foreign countries.

These clinicians, so far as it is possible, will be grouped and work under a banner which will specify the particular section of the country from whence they come; and each will demonstrate the best their respective states or countries have to offer for the advancement of dentistry. In this manner the spectator can learn the accepted methods of practice in the different parts of the world.

Following the splendid clinical program of the first day, the second day will be devoted to clinics given by members of the Illinois State Dental Society. Two hundred men will demonstrate the best that Illinois can produce, and in a way that will be unique in the history of dental clinics. The clinics will be divided into fourteen sections. These sections will be in separate rooms, capable of accommodating comfortably about one hundred and fifty to two hundred and fifty. Each section will be manned by from fifteen to eighteen clinicians, and all will be running simultaneously, but in such a manner that no member of the profession in attendance will miss a single point of interest. The supervision of each section will be under the direction of a chairman, who will give a brief lecture on the technic and important features of each clinic, thus making clear to every one the principles involved.

To complete the plan of this great dental meeting, the third day will be devoted to the celebration of the *Fiftieth Anniversary of the Chicago Dental Society*. This will be another innovation. On this day a large number of clinics will be given in the offices of Chicago practitioners. Each man being perfectly at home, as regards equipment, material, assistants, etc., can best show the way he accomplishes his special work.

The day will be divided into definite periods of time, arranged in schedule and tickets will be issued to individuals, which will admit them at a "specified time" to a certain office. When the clinic is over the visitors will leave, each going to the office he has previously selected for the next clinic. This plan gives every visitor the opportunity of personal attention and acquaintance with the clinician, and it also gives every operator the opportunity to show his favorite methods or other interesting specimens which he may have, and explain his system of conducting a practice. Later in the day the offices will be open to any one who cares to call socially.

In the evening an informal banquet will be held at the Hotel La Salle, to which all members, guests and ladies are cordially invited. Each one present at this banquet will be presented with a historical booklet, dealing with the origin, progress, achievements and contributions to the advancement of dentistry by members of the Illinois State Dental Society.

We have called attention to this meeting believing it will be one of special merit and that all who attend will derive great benefit.

South Carolina State Association

The forty-fourth annual meeting of the South Carolina State Dental Association will be held at the Chick Springs Hotel, Chick Springs, S. C., on June 17th, 18th and 19th.

All ethical practitioners are invited to attend.

The clinic will be in charge of Dr. I. Murray Hair, Greenville, S. C., who will furnish any information relative to same.

Exhibitors desiring space will please address Dr. J. P. Carlisle, Greenville, S. C.

Any other information will be cheerfully furnished by the Secretary.

W. Busey Simmons,
Piedmont, S. C.

> The earnest men are so few in the world that their very earnestness becomes at once the badge of their nobility; and as men in a crowd instinctively make room for one who seems eager to force his way through it, so mankind everywhere open their ranks to one who rushes zealously toward some object lying beyond them.
>
> —*Timothy Dwight, D. D.*

OBITUARY

George Washington Cook, B. S., D. D. S.

Died December 21st, 1913, at Hebron, Indiana

Dr. Cook was born near Fulton, Union County, Kentucky, Jan. 19th, 1866. About 1868 the family moved to Southern Illinois, locating at Harrisburg where his father and mother both died before he was seven years old. At the age of eleven years he went to live in the home of a physician named Hastings, near Carbondale, Illinois, where he laid the foundation of his medical and dental education.

His early education was obtained in the public schools of Jackson County, Illinois, and later he attended the State Normal School to prepare for entering college.

In 1888-89 he attended Northwestern University Dental School. From there he entered the Dental Department of the University of Iowa, where he received the D. D. S. degree in 1890.

After several years' practice he took up the systematic study of bacteriology and pathology as a special student of Dr. Stanley P. Black at Mercy Hospital, Chicago.

He also studied in the laboratory of Dr. Klebb of Klebb-Loeffler bacillus fame.

On the organization of the Illinois School of Dentistry in 1898 he became Professor of Histology and Bacteriology. In 1900 he was Professor of Pathology and Bacteriology. From 1906 to 1912 he was Dean of the Faculty.

Dr. Cook contributed many papers to the science of dentistry and was deeply interested in research work. He was a member of the National Dental Association, Illinois State Dental Society, Chicago Dental Society and Delta Sigma Delta Fraternity. G. N. W.

John Nathan Crouse, D. D. S.

Born September 15, 1842—Died January 16, 1914

Dr. Crouse was born near Downington, Chester County, Pa. Early education in village schools of Pennsylvania and Illinois; then in Mt. Carroll, Ill., Seminary 1859-62. Received D. D. S. degree at Pennsylvania Dental College, Philadelphia, 1867. Began practice of dentistry in Mt. Carroll, Ill., 1864, and since 1868 has been in practice in Chicago. Last surviving charter member of Illinois State Dental Society. Founded Dental Protective Association and was its President until December, 1913. Member of National Dental Association, Chicago Dental Society, Calumet Club. He leaves a widow and son (Dean).

SOCIETY·ANNOUNCEMENTS

The Panama-Pacific Dental Congress

A New Year's Announcement

OPENS AUG. 30TH, 1915

The Committee of Organization of the Panama-Pacific Dental Congress is pleased to greet the dental profession of the world with the announcement that now, twenty months before the date of opening, August 30th, 1915, the Panama-Pacific Dental Congress is so well advanced in the work of organization that the ultimate success of the Congress is fully assured.

Executive Committees in almost every state and country in the world are giving publicity to the Congress, securing memberships and soliciting contributions to the program.

The officers of the ten sections into which the program of the Congress is divided, have been selected, the list including many men of world-wide prominence and recognizd ability, and under their supervision a program is being prepared which will outrank in scientific value and literary excellence the program of any previous Congress.

Fifteen hundred front feet of space have already been reserved by manufacturers and dealers who will present to the Congress the greatest exhibition of dental wares and appliances, and the most comprehensive manufacturers' clinics ever assembled, and the list of exhibitors is still far from complete, and is increasing in number every week.

The Committee has distributed nearly four hundred thousand stickers, bearing the seal of the Congress and the date on which it will open, and they are becoming familiar to every user of dental supplies.

The entire Congress, Academic sessions, exhibits and clinics, will be held under one roof, in ample accommodations, in the new Auditorium now being erected in San Francisco Civic Center, an Auditorium which, in size, architectural beauty, and peculiar fitness for the purposes it will serve, will rank with the best of similar buildings yet erected.

Letters received by the Committee from every country in the world evince the wide-spread interest already manifested in the Congress and assure a large attendance.

The Panama-Pacific International Exposition will attract the people of the world to San Francisco in 1915; the Panama-Pacific Dental Congress will bring together at the same time the best the dental world has of men, methods and materials; to miss the Congress will be to miss the opportunity of a lifetime to become familiar with modern dentistry in all its branches.

The Committee on Organization extends a hearty New Year greeting of good wishes to the dental profession, and invites it to be present in San Francisco, August 30th to September 9th, 1915.

Kentucky State Dental Association

The Kentucky State Dental Association will hold a four days' post-graduate course at the Seelbach Hotel, Louisville, March 9, 10, 11 and 12, 1914.

The lecturers for the course are Dr. George H. Wilson, of Cleveland, "Prosthetic Dentistry"; Dr. Thomas P. Hinman, of Atlanta, "Operative Dentistry", and Dr. A. J. Bush, of Columbus, "Crown and Bridge Work."

We will also have papers and clinics for those who do not care to take the post-graduate course.

The usual invitation is extended to all ethical practitioners to attend. We are already assured of a successful meeting.

Chas. R. Shacklette, *Secretary,*
Louisville, Ky.

Michigan State Society

The Michigan State Dental Society will hold its annual meeting in Detroit, at Hotel Tuller, April 9, 10, 11, 1914.

The program committee has nearly completed its work, and promises a meeting in keeping with the progressive spirit of 1914. Full particulars later.

Oklahoma State Dental Association

The next meeting and third annual post-graduate course of the Oklahoma State Dental Association will be held in Oklahoma City, March 30th-April 4th, 1914. Drs. Jos. B. Eby and Thos. P. Hinman, of Atlanta, Ga., are to be the lecturers.

An important feature of the course will be a progressive clinic, conducted two afternoons of the week, by noted clinicians from out of the state.

C. R. Lawrence, *Secretary,*
Enid, Okla.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXIV MARCH, 1914 No. 3

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The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

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L. P. Bethel, M. D., D. D. S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

TECHNIC OF HOOD ABUTMENTS WITH REPORT OF CASES—AFTER FIFTEEN YEARS' USE.*

BY THOS. P. HINMAN, D.D.S.

PROFESSOR OPERATIVE DENTISTRY AND ORAL SURGERY, ATLANTA DENTAL COLLEGE, ATLANTA, GA.

IN THE CONSTRUCTION OF BRIDGE WORK, I have felt that it always is desirable to maintain as nearly as possible the integrity of the teeth supporting the bridge, and if possible mar them so little that they would maintain their natural shape and not disturb the cosmetic appearance of the mouth. In the construction of bridge work, where the abutments are in the anterior portion of the mouth, I have been surprised that so many operators still destroy the pulp and place a pin or pin crown in position for the purpose of supporting a bridge, even of minor size; when, if a hood of proper construction were made, a support of equal integrity could be secured without running the risk of apical trouble in destroying the pulp or changing the relation of the teeth to each other, and their appearance as nature intended they should be. Even by our best effort we are rarely able to construct a porcelain crown that, in some positions at least, by the refraction of light, does not present an artificial appearance. If a porcelain-faced crown, especially one suitable for bridge attachment, be placed in the anterior portion of the mouth, it is practically impossible to secure a natural life-like appearance, because the gold that backs the porcelain face is a barrier to the penetration of light and gives us an unnatural appearance; whereas, if, in the making of attachments on vital teeth, the hood is used, it will be found to be strong, durable and have sufficient strength to give the necessary support as a bridge abutment. I have been using the hood which I shall describe, in the anterior portion of the mouth for over fifteen years, and after I describe its construction I expect to give you a record taken from my books of some of the cases where I have used it. These records I am presenting for the purpose of reassuring those who have been timid about the use of the hood attachment. In the method of construction, I have endeavored, as far as possible, to design it along the lines of correct mechanical procedure.

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*Read before the Northern Ohio Dental Society, 1913.

HOODS FOR INCISORS AND CUSPIDS

Where it is desirable to replace a single incisor or two incisors or all four incisors, with the adjoining teeth vital, the hood or hoods may be constructed by carefully following the technic which I will now give.

We will suppose that we are constructing a bridge reaching from cuspid to cuspid and that both cuspids are vital. With a No. 543 Miller Carborundum Wheel a step is cut in the lingual surface of the cuspid about 1-16 of an inch above the gum line. This step is cut in a well-defined manner and extended straight across mesio-distally, and is about 1-16 of an inch in depth. Another step is then cut on the lingual surface on a line slightly above and parallel with the lines of normal proximal contact; this step, also, is extended the same depth into the dentine, the mesio-proximal surface of the tooth being cut away so as to extend the cavity to immune areas. This cut is stopped on a line with the gingival step, but it is not extended entirely through the labial enamel. If the occlusion is very close, the lingual enamel is cut away between the two steps so as to allow sufficient gold in the finished hood to produce strength. With a No. 3 bur a hole is drilled on a line with the long axis of the tooth, 3-32 of an inch deep, in the center of the linguo-gingival step. Two similar holes are then drilled in the occlusal step. These last openings are so made that they straddle the pulp. The cavo-surface angles are then carefully trimmed or beveled. This completes the preparation for a hood of this type.

Three one-thousandths pure gold is carefully annealed and then pressed with the thumb and finger against the lingual surface of the tooth and carefully burnished and malleted to an approximate adaptation. The automatic mallet is used with a piece of orange wood with a square end for a plugger. Holes are then punched in this gold to correspond with the openings in the tooth. Pins made of 20-gauge iridio-platinum wire are then placed in these openings and carried down to the bottom of the holes letting them extend through the backing far enough to allow the modeling compound to engage them. Impression is then taken in modeling compound, which, when thoroughly chilled, engages the pins and the gold backing and pulls them out together. After the impression is removed, the model is run in investing material and the modeling compound is removed with a great deal of care so as not to dislodge the pins. The pins are tacked to the gold backing with a very small quantity of 22-karat solder. This backing and the pins are then returned to the mouth and the backing is carefully burnished and carried slightly under the gum lingually and mesially and allowed to lap the occlusal surface. It is then removed, invested and an additional quantity of 22-karat solder flowed over it to produce the necessary thickness to give strength and rigidity. The reason for replacing the backing before the final thickening is that it gives perfect alignment of the three pins as well as assuring a more certain adaptation of the gold to the tooth. Hoods of this description may be used on the cuspids to swing in the lateral, on one central to swing in the other central, on both laterals to swing in both centrals, on both cuspids to swing the four incisors, and are frequently used by me as the anterior attachment of a bridge beginning at the first molar and carrying both bicuspids.

HOODS FOR BICUSPIDS

In the construction of anterior attachments on bicuspids which are to be used as bridge abutments, it has been a very usual practice to put the gold crowns on these teeth, which is objectionable for cosmetic reasons. An attachment made in the manner which I will describe is equally as strong and it has the advantage of retaining the appearance of the natural tooth. In the construction of a bridge extending from the first bicuspid to second or third molar, a hood may be constructed on the first bicuspid in the following manner:

The lingual cusp is entirely ground away and the lingual surface of the buccal cusp trimmed so as to allow sufficient thickness of gold to resist the pressure of mastication. The lingual enamel is then removed as for a crown. Two cavities are then cut in the mesial and distal surface of the tooth, all lines being parallel or slightly convergent toward the occlusal surface. Three one-thousandths pure gold is then burnished and adapted to these surfaces. This is sometimes very difficult and if it is found desirable, a modeling-compound impression may be taken of the tooth so prepared and an amalgam model made of it on which the thin pure gold may be either swaged or burnished. The final adaptation, however, should be done in the mouth. This backing is removed and 22-karat solder flowed over it for the purpose of stiffening, care being taken not to allow the solder to cover the margins. It is then replaced in the mouth and all margins carefully reburnished and the excess trimmed so as to allow only a slight lap, care being taken to carry the thin pure gold slightly under the gum margins all around. Wax is now melted or forced all over the gold surface and the patient allowed to bite into it so as to get a correct occlusion. This is very difficult to do in the mouth; therefore, the wise plan is to take a modeling compound impression and bite—run a model—and place in small articulator. Inlay wax is then melted all over the gold and the wax carved so as to restore the parts of the tooth which have been ground away. This may then be invested and cast in the usual manner. If one desires, instead of casting, a cusp may be swaged and waxed into position on the occlusal surface and after proper investment the solder may be used in place of casting.

The question will naturally arise as to why I do not cast these hoods direct instead of using pure gold backing. In answer to this query, I will say that it would be practically an impossibility in the bicuspid hood ever to get it to place after it is cast, and in the hood that is used on the cuspid and incisors, it would be very difficult to get the pins in correct alignment and at the same time to force the wax under the gum, and I have found that it is more desirable to use the gold backing.

In cases where the pulp is dead in cuspids, laterals or centrals, a hood may be constructed, using the same preparation as for the vital tooth, except that instead of putting in the three pins I prefer to use No. 4 gauge iridio-platinum wire which has been tapered to fit the canal. I know that this is an old method of making a hood, the only difference is that I prepare the lingual surface of the tooth with steps which gives a much better mechanical resistance.

RECORD OF CASES

Case No. 1—Right central swung to left central on hood—tooth vital—placed in position 1898—examined early this year and found to be in perfect condition.

Case No. 2—Bridge extending from right upper first molar to cuspid—cuspid vital—placed in position December 7, 1901, examined March, 1913, found to be in perfect condition. Cuspid pulp died in two years; root then filled.

Case No. 3—Left central swung to right central on hood—tooth vital—placed in position 1904—saw case in April, 1913—perfect condition.

Case No. 4—Bridge from right upper first molar to cuspid—hood on cuspid—tooth vital—placed in position 1904—worked loose 1912—no decay.

Case No. 5—Bridge from right upper cuspid to left upper cuspid—hoods on both cuspids—both teeth vital—placed in position February, 1905—worked loose in 1910—re-cemented—case examined 1913—perfect condition.

Case No. 6—Bridge from left upper third molar to left upper first bicuspid—bicuspid hood placed in position October, 1905—patient left the city in 1911 and work was in perfect condition at that time.

Case No. 7—Right upper central swung to hood of left central—tooth vital—placed in position November, 1905. Case seen in 1913, perfect condition.

Case No. 8—Bridge from right upper cuspid to left upper cuspid—left cuspid vital—right pulp dead—placed in position 1907—seen in 1913—still in perfect conditon.

DISCUSSION.

Dr. L. E. Custer, Dayton, Ohio: The first statement of Dr. Cook's, and one which I regard as of prime importance, is that pertaining to preservation of the pulp. Now I know that in certain parts of the country it seems to be the universal practice, when a tooth is to be crowned with a gold crown or by some similar method, to devitalize and remove the pulp. I have always felt that was wrong. There is often too much removing of the enamel in preparing teeth for crowning. All that is necessary, in many cases, is to remove it from one side of the tooth. Then in many cases you have done all that is necessary by way of paralleling the sides of the crown.

The plea for devitalizing is based on the claim that the pulp dies anyhow. Not necessarily so; not usually so, if there be not an excessive and superfluous removing of enamel. That is what does the mischief. Over and against this claim stands the fact that often even when the enamel has been wholly removed, no trouble has ensued.

I agree thoroughly with the reader of this paper that if the pulp should die, that indicates unmistakably that it should have been destroyed in the first place. But that is not laying down a general rule to the effect that all pulps should be destroyed in cases where we strip off enamel for crowning. What if the pulp does die? It is not a matter of insurmountable difficulty to get at the remains through the gold crown. Drilling through the occlusal surface of the gold crown does not materially weaken it. Meanwhile you have taken a fair risk, indicating that in many cases no such unfortunate outcome would follow neglect to destroy the pulp primarily.

As regards the technic of Dr. Hinman's operation—it is a very delicate matter to drill the three holes for the reception of the pins which are to hold on that gold base, perfectly parallel. I have not been using the method as described by Dr. Hinman, but I have made the holes as described by him. The paralleling is to be done all at one time, as regards the three holes, without removing your hand from the teeth. Then you will succeed in getting them true.

The advantages of the method described are, first, no display of gold; second, comparatively little dressing away of tooth-substance. Finally, it is enough for me to know that Dr. Hinman reports numbers of cases thus treated which have lasted as long as fifteen years. That, I call success.

Dr. W. T. Jackman, Cleveland, O.: I have had no opportunity to see this paper, but am greatly interested in the subject, which is a vital one—the restoration of a tooth or teeth without a plate.

I have done some work along these lines, and have found it very satisfactory. We must, however, carefully select our cases. There are some cases where, owing to peculiarity of occlusion, this method will not do. Where the bite is somewhat open, and we wish, for instance, to restore the four incisors, it is a most admirable method. I have put in a number of such bridges, and they have thus far done well.

I want to emphasize Dr. Custer's objections to devitalizing. I never do that if I can avoid it. Unless there be deep decay not one pulp in twenty will give trouble later. I grind undecayed teeth for bridge-abutments, and seldom or never destroy the pulp where an all-gold crown is used. As Dr. Custer says, it is no very difficult matter to get at and remove a dead pulp, if eventually that should become necessary.

A word or two relative to crown work: Permit me to enter my most earnest protest against the use of the unbanded Logan crown or any unbanded crown. A good root is of too much value to risk its durability by inserting a crown that is ground to fit approximately and then expect the cement to preserve or save that root end from decay. (Applause).

I invariably make a metallic cap—iridio-platinum for the band, gauge 34—and complete the cap with 28-gauge platinum. When this is done carefully there can be no question about saving the root end. I prefer iridio-platinum to gold. It is more difficult to fit, but it stays fitted when once made.

I hope the time is at hand when no ethical dentist, laying claim to artistic taste, will place a gold crown where it will be seen.

Our patients are demanding that we adhere to nature's model, and that is what henceforth we must do.

Thus Dr. Hinman's paper is apropos and very helpful.

Dr. Alden Bush, Columbus, O.: I did not intend to discuss any paper when I came up here today. This is my first meeting with Dr. Hinman. I am sorry to differ radically with him, on first acquaintance. Others who have followed him developed in their discussion some things merely hinted at by him.

The first of these was this question of devitalizing. There is no question more persistently misunderstood than this of devitalizing. Now, there are a few well-defined conditions that render devitalizing justifiable. The first is: facility of making preparations for crowning, the deduction being that there are other requirements besides preservation of the pulp, of prime importance. There is the requirement of adaptation and fit. Now I, for one, cannot understand how it is possible to make a band and pass it over a tooth, and have it fit perfectly, around the neck, getting close adaptation, without having first devitalized that tooth. In most cases the patient cannot endure the pain necessarily accompanying so radical an operation, unless the pulp be first destroyed and removed. To reduce the tooth to a true cylindrical form absolutely necessary for a perfect fit of your crown, all enamel must come off, and its removal is often, usually, painful beyond endurance. Some do not do it this way, but we question the reliability of their methods.

These requirements we esteem more important than the saving alive of the pulp.

I have been surprised by some advocating going ahead, taking the chances, since, in case of trouble from the pulp, that can be attended to just as well later on. Not always—it is not always an easy matter to get at an inflamed pulp through a thick cap of gold. In my judgment the more expedient thing to do is to devitalize at the start. If you use inlay attachments for your bridge, devitalizing may not be required. But if you are going to crown, by all means devitalize. You may say it is undesirable to devitalize, if you use inlay attachments. Discoloration is to be considered. This happens in spite of all our care.

As regards the inlay attachment—it is all but impossible to cast an inlay which will go to its place satisfactorily, in the cavity. I use the matrix method and—*I want to surpass myself when I fit that matrix!* There are various chances for error to creep in. You cannot possibly avoid all of them in a cast inlay. They will not fit.

Dr. Jackman made a good point regarding the method of making crowns to retain bridges in the anterior part of the mouth. It is a poor operation in which dependence is placed on a plate-and-dowel crown to support a bridge, so my idea is, not to make a bridge in the anterior part of the mouth, or, indeed, anywhere, using a dowel crown, unless I use a full band in conjunction with it.

In conclusion I want to say that I should not advise anyone to place too much reliance on any method of bridging where an inlay is used for support. I decline the responsibility of recommending the method. In fact, I think they will always fail. I myself do not do it—make inlay attachments—except in cases where I can be assured of my patient's taking care of the teeth, and I feel more comfortable, after having inserted such a bridge, if the patient will agree to come in once a month, to have the teeth cleaned.

Dr. W. A. Siddall, Cleveland, O.: The last speaker has assumed that the crown should always have a band fitted closely to or under the margin of the gum.

In my opinion, in many cases that is wholly unnecessary. The band can be made to extend only half or two-thirds of the distance from the occlusal surface to the gum line. In such cases extensive cutting of the tooth is not required, consequently it is not necessary to destroy the pulp. I recently saw a bridge one end of which was supported by a molar crown made in such a manner, and although the appliance had been in place eighteen years there was no evidence of decay. I have made a good many hood attachments somewhat similar to the method Dr. Hinman describes, many of them with no pins at all but depending upon cavities in the tooth for anchorage. If I make a hood or inlay on a cuspid to support a lateral dummy, provided the piece is fastened *only* at the one end, I do not find an exceptionally strong attachment necessary.

Dr. S. M. Weaver, Cleveland, O.: I have enjoyed Dr. Hinman's paper greatly. I follow out the hood crown methods on all anterior teeth, the technic varying a trifle. The crown is not strong enough for back teeth. If there is any looseness of abutments, I use a staple in the cavity, if possible.

Now as to destroying pulps, there is no way we can tell absolutely, but I believe if we could count the numbers of ill-fitting gold crowns in all cases where we have pulps dying after bridges are set, and could note the instances in which death of the pulp occurs with a well-fitting crown, we should gather some significance from that fact. I believe those pulps die of pericemental trouble, rather than from the removing of enamel. Lining the crown with gutta percha or pencilling the exposed surfaces with Ag. NO_3 will prevent pulps dying. Of course pulps in teeth with large cavities or large amalgam fillings may die.

Bell-Shaped teeth without cavities, however, must often be devitalized. High pressure anesthesia should be employed. In my own practice I do not remember of but occasional pulps dying where the crown has been properly fitted. As I said before, the inflammation of the peridental membrane caused by bad fitting crowns is what kills the pulp.

I do not like the half-jacket crown. Nor do I like platinum for the band. It causes a discoloration in a few years and I have never known it to fail. Dr. Bush certainly has begged the question. I do not think that ten per cent. of pulps die under crowns if the case is managed right.

Dr. Geo. Bishop, Cleveland, O.: In attempting such appliances as Dr. Hinman has described, strict regard for mechanical principles must be taken into account. Long pins, such as are common in teeth that have been devitalized, are unnecessary. All the attachment you need, by means of pins, is enough to prevent the base-plate to which they are attached from pulling out. The steps or flat base are the main consideration and must sustain the force to be exerted in mastication. The pins need not necessarily be iridio-platinum, for the strength of such pins is at the point adjacent to the hood.

The hood is one form of inlay; it may serve the double purpose of a filling in a cavity and an attachment to sustain the bridge.

E. C. Mills, Columbus, O.: This hood attachment Dr. Hinman has so fully described in his excellent paper, is referred to in some of our recent works on crown and bridge work as a ''pin and plate'' attachment, and is recommended as a temporary expedient only. As I have been making use of this attachment during the past two years, the report of the cases after fifteen years of service, as presented by the essayist, are of great interest, because if clinical experience stands for anything, this attachment must be accepted as a permanent device.

It has been my practice, when soldering the pins to the plate, to conform a piece of clasp metal to the cervical portion of the latter, which is soldered in this position. This strengthens and reinforces the attachment, and lessens the liability of bending the bridge if there is any difficulty in putting the piece to place, and protects the gingival margins in the excursions of the food.

One of the first bridges I constructed, using this attachment, extended from the first upper right molar to the left central. A shell crown was used for the molar, and the hood attachment for the left central and right cuspid, using two pins for the former and three for the latter, the pulps uninjured. With little care it is an easy matter to drill the holes for the pins parallel, and it is a pleasure to see how nicely a piece of work constructed in this manner goes to place.

As to devitalizing the pulp—at a recent meeting of the Ohio State Dental Society the matter was discussed, and a straw vote showed that one out of an assembly of possibly two hundred dentists, made it a practice of devitalizing all teeth used for abutments in bridge work. It seems as useless to devitalize in inserting an ordinary filling, not to mention the extensive fillings and inlays that are daily inserted in vital teeth, with no thought of subsequent trouble.

The radiograph is constantly showing conditions about the apices of roots that have been successfully (?) treated and filled. Clinical experience augurs well for the conservation of the vitality of a tooth, when possible.

Dr. H. C. Kenyon, Cleveland, O.: We have been listening to a line of discussion from Dr. Bush and others, and now finally it appears two different topics have been under consideration.

I beg to say it depends upon the inlay and the conditions attending its making and insertion, whether or not it will prove a good attachment for a bridge. I have seen bridges anchored by means of inlays which seemed to be doing well. The percentage of successful cases with hood attachment and where inlays are used, is high.

Dr. Siddall's suggestion as to crowns is an important one to be considered. Personally I do not think it necessary or wise always to carry the band of a cap-crown under the gingival margin. I bring it only part way down. You can set a post in the occlusal surface of a molar, in many cases, so firmly that the crown will stay everlastingly.

I have had Dr. Siddall's experience exactly; observation has shown that in cases where I have used the short band crown, sanitary conditions have been found to prevail, after years of use.

Dr. Hinman: You have discussed everything but my paper. I did not say a word in it about devitalizing pulps; you are responsible for all that. What I said was, that I could make a good attachment without devitalizing the pulp—then you all got mad.

I do not want you to make a hood attachment by the cast inlay process, or any inlay process, whatever. What I suggested and told in detail was how to burnish pure sheet gold into the prepared cavity, and make a fit superior to any you can get by any cast inlay method. I said nothing about casting. The pins I suggested using are platinum—iridio-platinum. Cast pins would not be strong enough. I want you, if you are going to use my method, to follow out my most minute details, as to fitting the gold to the cavity, inserting pins—the kind of pins—*everything*. Otherwise you are not using my method.

Dr. Custer indicates how he makes the three pits for the reception of the pins, at one time, without withdrawing his hand from the patient's mouth. That is all right; that enables him to sense the accuracy of paralleling the pits. All my work is done under water. Keep the parts of the tooth constantly wet.

You cannot accomplish successful results by casting hoods. The cast pins are not strong enough, and the method lacks accuracy.

DIAGNOSIS AND TREATMENT OF MAXILLARY EMPYEMA

BY DON M. GRAHAM, M.D., D.D.S., DETROIT, MICH.

WITHIN RECENT YEARS there has prevailed a wide difference of opinion between the rhinologist and the oral surgeon regarding the relative frequency of maxillary infection. The rhinologist, on the one hand, claiming that fully eighty per cent. of antral infections were of intra-nasal origin, while on the other hand, the oral surgeon, with equal emphasis, and we might say with similar proof, insisting that not less than eighty per cent. were of dental or alveo-dental origin. These apparently contradictory yet relatively correct statements, from the standpoint of each operator, would seem impossible of reconciliation did we not stop to think that the oral surgeon and the rhinologist receive their cases from two entirely different sources as a general rule. The oral surgeon, naturally, has the majority of his cases referred to him by the dentist, who, treating a tooth, finds a fistulous opening leading into the antrum, or a root canal which allows of a broach passing into the antrum, logically refers the case to the oral surgeon. Getting a great many of these, and treating them from an alveo-dental standpoint with almost immediate recovery, he was to be expected to proclaim that a very large percentage of antral empyemas arose from this source.

The rhinologist, on the other hand, treating, generally, patients referred to him by physicians was naturally the recipient of victims of influenza and all forms of intra-nasal defects, and sequellae of infectious diseases—all of which are important etiological factors in this disease—logically enough treated these cases intra-nasally but illogically concluded that nearly all cases of antral empyemas were of intra-nasal origin. The truth is that each has arrived at conclusions logical enough for cases referred to them, but forgot to take into account the vast number of cases which naturally were intelligently referred in another direction where treatment suitable to the case was instituted and entirely satisfactory results obtained.

It may safely be said, we think, that the majority of acute infections of the antrum are of intra-nasal origin, the greater percent. of which require no treatment except possibly an occasional irrigation, which effectually relieves the condition; and as truthfully can it be said that the majority of chronic purulent antral empyemas are of dental origin, and any attempt at treatment which ignores this origin must prove frequently futile and mischievous. The fallacy of the statement that purulent antral empyemas are seldom, if ever, the result of infected teeth, can be refuted by any intelligent dentist who can testify that he has had in his practice one, if not many, infected antra which immediately returned to normal after the correction of the dental pathologic condition.

On the other hand, the position taken by some oral surgeons that practically all infections of the antrum are of dental origin seems to be disproved in many of our large nose-and-throat clinics, where innumerable cases are met and successfully treated with little if any reference to a possible dental origin. The fact is, however, that justice to our patients demands that a most careful examination be made to ascertain the exact cause, for when this is obtained more than half our task is done. The operator who has not an intelligent knowledge of intra-nasal pathologic conditions is undoubtedly illy equipped for the important duty of treating a diseased antrum. and he who ignores or even thinks lightly of a possible dental infection as the etiologic factor, falls far short of his professional duties to his patients. An accurate diagnosis, therefore, is the first requisite in the treatment of a maxillary empyema.

The history will usually shed some light on the etiology of the case, and symptoms are many and varied, depending on the drainage, the infecting agent, and the duration of the pathologic condition. In very few cases have we severe pain or even a rise of temperature. A profuse discharge is one of the early symptoms, and a canary-tinged secretion the rule. Indeed, this canary tinge is the most constant, if not the most accurate, symptomatic factor we have, and not infrequently do we have patients complaining of using several handkerchiefs to take care of the morning secretions. Later this color will disappear giving way to varied hues depending on the infecting agent and the degree of chronicity. If a tooth be the cause of the infection, we invariably have a fetid odor. The element of pain is not constant but in some acute cases we have pain in the malar region, of a deep-boring character, with usually a feeling of pressure and distension in the region of the antrum. When the condition

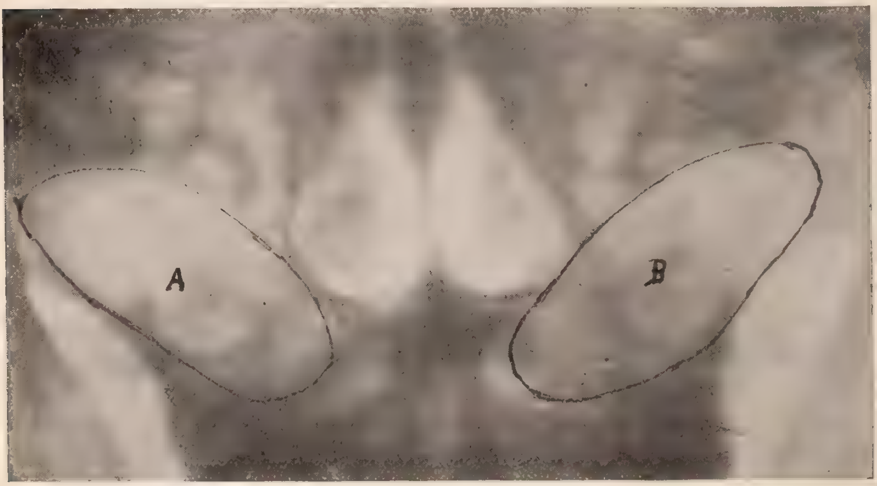

Fig. 1—This radiographic plate, (two-thirds normal size), shows unequal density in antral areas. The darker shaded area B indicated an antral empyema which was confirmed by puncture and irrigation.

has become chronic, we sometimes find headaches of the dull, septic type, with a noticeable loss of appetite as well as a distinct loss of body weight.

The importance of an early as well as a correct diagnosis can not be overestimated, and with the means we have at hand there is no excuse for a surmise in the case, even when symptoms are obscure or entirely lacking. With a history of discharge, the nares should be wiped clear of all secretions. and if necessary, for a more thorough inspection, the suspected side is tamponed with cocain and adrenalin to contract the tissues and permit of a more thorough and painless examination. Pus found between the middle turbinate and the outer wall may come from one of three sources, a frontal sinus, a maxillary sinus. or ethmoidal cells. In the latter we have almost invariably polypi in the ethmoidal region, which may cause a damming back of pus. and as a result a maxillary empyema may be secondary to a primary ethmoiditis or a frontal sinusitis.

Having concluded inspection, the next step in order is transillumination, which will usually show whether the antrum is normal, or whether this cavity is filled with pus or inflammatory detritus, or its lining mucous membrane thickened by inflammation. Allowances must be made, however, for bony contour, and density and thickness of alveolar ridge. Comparison of the two antra will be helpful in this method of diagnosis. but allowances should always be made for the possibility of a bilateral infection, in which case we have no contrasting healthy side for comparison. The normal antrum will permit of the diffusion of light through the lower portion of the cheek, the alea nasi, the lower eyelid, as well as give a reddish glow to the pupil. In the diseased antrum the light is not so thoroughly diffused when placed in the oral cavity. Of this means of diagnosis, it may be said that it is very helpful but not infallible, and should never be more than supplemental in the routine method of diagnosis, as operative procedures have proven its unreliability many times.

The next in importance. from a diagnostic standpoint, but of no greater reliability, is the X-ray plate; and for much the same reason. As a routine practice. however, its employment is to be recommended, and it will have an additional value in aiding the operator as the anatomical landmarks, spurs, septa. or any deviations from the normal, will be indicated on a good radiograph. Its diagnostic findings are not to be taken as final but. like transillumination, supplemental. In revealing infective areas about apices of teeth, the dental film is invaluable. and in locating the offending tooth, when the empyema is of dental origin, a good dental skiagraph is indispensable.

If any doubts yet remain as to the condition of the maxillary sinus there is at hand a very simple, yet absolutely reliable procedure, by which we may know positively the condition of the antral contents. We refer to the method of antral puncture and irrigation. The sterilized reinforced needle or trochar and canula is forced through the naso-antral wall. several syringefuls of normal salt solution are forced through the needle or canula and the contents collected in a pus basin when they can be examined at will. This procedure is rather painful, and thorough cocainization is essential to the comfort and complete success of this undertaking; but our own preference is for nitrous oxid anesthesia, which allows of sufficient time to puncture the antral wall at any desired point. It is advisable to force several ounces of fluid through the antrum, for it has happened that the first syringeful has passed through the sinus practically undiluted by the antral contents, but subsequent washings revealed thickened pus and bacterial debris.

It is our custom to exclude. first of all, the possibility of the empyema being of dental origin. This can usually be done without much difficulty. If molar and bicuspid teeth are vital we may safely exclude the possibility of its being of dental origin, although an incisor tooth apparently caused one of the most troublesome empyemas with which we have had to deal. If thermal or electric stimulation shows these teeth to be devitalized, careful search should be made for infiltration or apical inflammation about these teeth which could easily cause the empyema. It is in these cases that the dental film is indispensable, as any considerable area of liquefaction about the apices of these teeth will suggest a dental origin, while fistulae in this region will sometimes be found to communicate with the antrum.

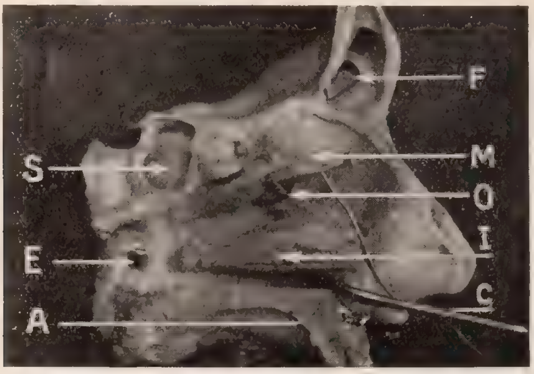

Fig. 2—This cut shows intra-nasal structures to be considered in causation and treatment of antral empyema. F, Frontal sinus with flexible probe passing through normal opening under middle turbinate. M, Middle turbinate and outline of ethmoidal cells. O, Normal opening into antrum with middle turbinate everted. I, Inferior turbinate body. C, Canula for irrigating maxillary sinus. S, Sphenoidal sinus. E, Orifice of eustachean tube. A, Maxillary body. Specimen one-half normal size.

A careful inspection of the nasal passages will reveal their condition, and will often shed a flood of light on the causation of a maxillary sinusitis. A ten-per cent. cocain solution and careful packing of the nasal passages will allow us to make a most careful examination of them, when intra-nasal etiologic factors can be detected. An enlarged middle turbinate, a polypus, a drainage from a focus of infection such as diseased ethmoidal cells or frontal sinus is sufficient causation for a maxillary empyema.

Having satisfied ourselves as to the origin of infection we are now prepared to institute treatment. It is well to recall that the majority of acute cases of intra-nasal origin will spontaneously recover and unless we have evidences of systemic involvement, it is advisable to treat the case expectantly by nasal douches and applications calculated to contract the tissues to afford better drainage, watching for improvement by trans-illumination every few days. If improvement does not appear evident, and we are convinced that we must assist Nature in drainage, then it is the part of wisdom to puncture the naso-maxillary wall and irrigate. The particular site is not dogmatically stated as experience has taught that different antra can be reached through different points, depending on the anatomy and the naso-pathologic condition of the individual. This procedure will add greatly to our knowledge of the true condition of the sinus, as its contents can be secured and examined. There being no nasal abnormalities or gross pathologic conditions, this method of treatment can be kept up at intervals of forty-eight hours until the antral mucous membrane is restored to health, as our irrigations will plainly show. If the pathologic condition has proceeded to the destruction or partial destruction of the mucous membrane, or to great thickening through round cell infiltration, our irrigations will prove ineffectual, and it will then be necessary for us to secure more perfect access and better drainage than we had by means of canula or irrigating needle. The obliteration of the inferior naso-maxillary wall, to admit easily a large irrigating point or the applicator, will be in order. With this improved drainage and easy access, the antrum can be more thoroughly irrigated and its mucous membrane treated by one of the many silver salts, when repair can be confidently expected to take place if the infection has not been of too long standing. It is unjust and unprofessional to do a radical antral operation before we are sure that the milder and more simple methods of treatment are of no avail.

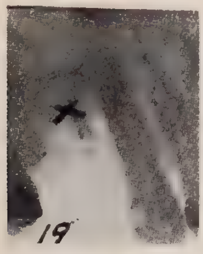

Fig. 3—Retained root tips which caused alveolar abscess and antral empyema.

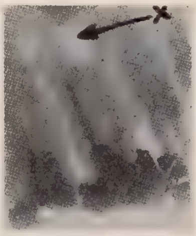

Fig. 4—A diseased molar root which caused an antral empyema.

Normal salt solution is preferred to the more complex washes recommended but it is sometimes found beneficial to revert occasionally to a permanganate of potash, a dilute phenol or a mild alcoholic solution in the more obstinate cases, but an early return to the saline is recommended in all cases.

Having assured ourselves that the empyema defies all efforts of irrigation and application of medicaments, we are justified in undertaking a radical operation with the confidence that we can completely obliterate the cavity by granulation tissue and thus remove this sinus from any possible source of infection. Briefly, there are two methods of procedure in operating radically on an antrum. The one, intra-nasal, the other intra-oral. Each has its advantages as well as its disadvantages. Each has its advocates as well as its critics, but it should always be borne in mind that the method selected should have due regard for the pathologic findings in the case. The intra-nasal is always the operation of choice when the pathologic findings are unquestionably intra-nasal. A deflected septum, an enlarged middle turbinate, the presence of polypi or any excessive intra-nasal tumescency will suggest their correction and entrance by this route. On the other hand, if we have infection of dental or alveolar origin with the presence of necrosis in this region, the operation of choice is undoubtedly intra-oral. Indeed, it might be said that the intra-oral route furnishes us the easiest, the most direct, and the most satisfactory route in all long-standing chronic empyemas that have failed to yield to more conservative methods. The old rule of extracting a tooth and trying to reach all nooks and corners of the antrum in our curettage is as unscientific and impossible as trying to curette this sinus through its normal nasal opening. If a tooth be itself the source of infection, its extraction is undoubtedly demanded and all necrotic tissue must necessarily be removed.

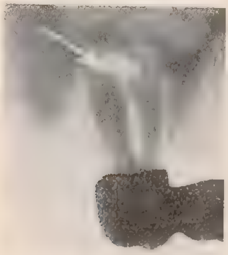

Fig. 5—Molar tooth which caused an antral empyema.

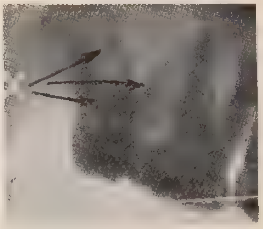

Fig. 6—Dentigerous cyst which was complicated with a maxillary empyema.

The writer's choice of operation is the so-called modified Denker. The patient is anesthetized, either local or general, as preferred, the skin of the face sterilized with iodin as well as the buccal mucous membrane. An incision is made in the alveo-buccal fold on the affected side extending from near the median line to the last molar tooth parallel to and half an inch above the gum line. The mucous membrane and periosteum are forced downward and upward, exposing completely the outer wall of the antrum. A chisel is easily forced through the canine fossa, and with bone-cutting forceps the wall is completely removed as high up as the intra-orbital foramen and, anteriorly and posteriorly, sufficiently to bring the whole mucous wall into view. Now, with various shaped curettes, the mucous membrane is completely removed from every nook and corner, for any small shred of mucous membrane left will surely result in failure of complete obliteration. Our attention is now directed to the antra-nasal wall which should be sufficiently removed to allow of drainage until obliteration is complete. The cavity is packed with iodoform gauze which allows of its removal through the nasal cavity and the oral incision is now closed with sutures which need be very few as the edges of the wound naturally approximate each other. After forty-eight or seventy-two hours the gauze is removed and need not be replaced. The cavity should be washed at regular intervals until it is obliterated, which usually takes from eight to twelve weeks. There is considerable difference of opinion as to the extent of wall which should be removed, some insisting that the naso-maxillary wall should be removed only as high up as the attachment of the inferior turbinate body, preserving this structure, which is functional in character, while others go to the opposite extreme and insist that the naso-antral cavity should be made continuous. In any event, the obliteration of the antral cavity by healthy granulation tissue is the important object, and conservation of turbinate body should not interfere with this result. However functionally valuable the turbinate may be to the respiratory apparatus, if its preservation is going to prevent drainage and subsequent treatment, it should be sacrificed.

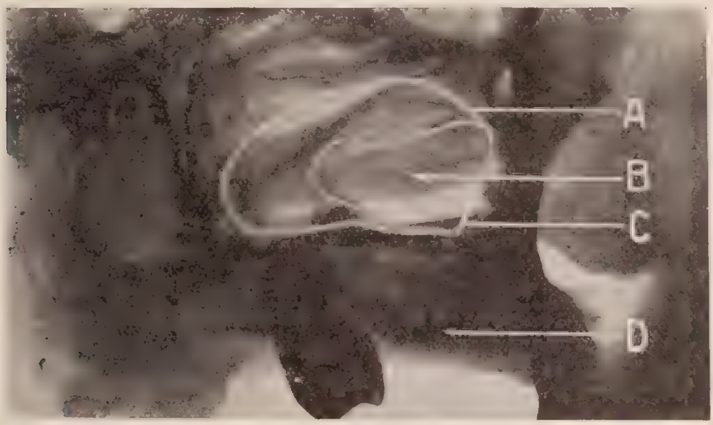

Fig. 7—This specimen shows the oral aperture as well as the naso-antral aperture in a radical operation (Denker). A, The larger circle shows approximately the extent of antra-oral wall removed. C, Smaller circle shows size of naso-antral window leaving the inferior turbinate body intact. B, Inferior turbinate body. D, Maxillary body. Specimen two-thirds normal size.

When large areas of alveolar tissue are necrotic, involving several teeth, for instance, a complete removal of all the diseased tissue is demanded before curettement of the antral cavity is begun. If the antrum can now be completely curetted it is, in our opinion, the part of wisdom to do so, leaving untouched the naso-antral wall. The cavity is packed as before with iodoform gauze and this treatment changed as often as necessary until complete obliteration takes place. This method is a long and tedious one for both operator and patient, as it will require repacking every two or three days for at least six months and more probably a year, but it has the advantage of allowing the operator to watch the progress of obliteration, and no doubts need be entertained of its complete success when no longer any packing can be retained in the cavity. In some of these long-standing cases we encounter polypi when their thorough removal is demanded. Antral empyemas are also occasionally found to be secondary to cystic degenerations in and about the antrum. If they are without the antral wall care should be taken not to make them continuous with this cavity. If, however, the antrum has become affected by the cystic contents it is then to be treated conservatively or radically as the conditions demand.

CHRONIC ORAL INFECTIONS ASSOCIATED WITH TEETH; AND THEIR TREATMENT*

ILLUSTRATED WITH STEREOPTICON

BY WM. H. G. LOGAN, M.D., D.D.S., CHICAGO, ILL.

ONE FINDS IN MEDICAL AND DENTAL literature during the last twenty-five years the frequent appearance of articles containing the statement that there is a close relationship existing between some chronic oral infections and certain systemic diseases. However, it was not until the appearance of articles by such noted physicians as Drs. Lambert, Hunter, Kenneth Goadby, of Europe; Frank Billings, Wilbur E. Post, D. J. Davis, E. C. Rosenow and Charles Mayo, of America, that the entire membership of our profession realized the seriousness of the relation that exists between chronic oral infections and systemic disease.

Accepting as we must the contents of these articles as declaration beyond scientific dispute, the dental and medical profession is confronted with the necessity of developing a better working knowledge of not only how to prevent, but how best to treat such frequently-occurring chronic conditions as septic pulpitis, putrescence of the pulp, chronic dento-alveolar abscess and pyorrhea alveolaris.

However, this paper by request will in the main be confined to the diagnosis and treatment of the various types of chronic dento-alveolar abscesses and the prognosis of pyorrhea alveolaris (so-called). The ef-

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*The illustrated lecture on this subject given by Dr. Logan at the Indiana State Dental Society was so poorly reported that the Doctor could not revise it satisfactorily and he suggested that we publish, in lieu of that report, the paper here presented which was given at the Illinois State Dental Society and published in the October *Dental Review*, but which contains the subject matter Dr. Logan covered in his lecture before the Indiana State Dental Society, 1913.—Editor.

fort will be made to outline what course of treatment is best suited to control the usual resultant conditions found present when a patient presents with a chronic dento-alveolar abscess, with varied degrees of destruction in the supporting structures about the root ends; the indications and limitations for root-end amputations and the demands for extraction. A brief review of the effects resulting from leaving teeth in the mouth diseased with the condition spoken of by the profession as pyorrhea alveolaris, with a statement of when it is wise to extract rather than to treat teeth involved with this chronic suppurative process.

DIAGNOSIS AND TREATMENT OF CHRONIC DENTO-ALVEOLAR ABSCESS

The presence of a chronic dento-alveolar abscess is easily diagnosed in those instances where we can locate the orifice of a discharging sinus that leads to the periapical field where the initial acute suppurative process had its origin. However. in those cases where the orifice of the sinus is so located that one cannot with a probe determine what tooth is involved, and an X-ray is not to be easily secured, all suspected teeth should be tested for pulp vitality with the Faradic current as outlined by Prinz; or by placing the rubber dam about one tooth at a time and applying hot base plate gutta percha or a heated instrument on the labial or buccal surface of these suspected teeth. The importance of positively ascertaining about what tooth the abscess had its origin has been brought to my attention by the frequent presenting of patients for whom a normal root canal had been opened or the wrong tooth extracted. As an example of this type of mistake, we will review the case of Miss H. G., aged twenty-four years, presenting with a history of a discharging sinus for the past three years.

The orifice of the sinus was located on the labial surface just in front and a little below the end of the root of the upper right lateral incisor. The tooth contained a root filling which was removed to treat the dento-alveolar abscess supposed to be about this tooth. After a number of fruitless efforts to establish the sinus by carrying the fluids through the lateral incisor, treatment was taken up by the external opening and continued in the root canal for a brief period. Then the sinus temporarily closed, the root canal was refilled and in the interim the lateral crowned. In a few months the sinus was re-established through the old tract. Unsuccessful efforts were made under nitrous oxid and local anesthesia to control the condition by curettement of the periapical tissues and root amputation. Later the recently crowned lateral was extracted and the socket curetted. The sinus closed for a brief period, then again opened.

At this time the patient was referred and by carefully entering the orifice with a delicate silver probe it was discerned that the tract apparently led to the apex of the right upper cuspid. This tooth and the first bicuspid were then tested for pulp vitality with negative findings. Both centrals under gutta percha heat tests gave normal pulp reaction. A radiogram was then taken to verify our diagnosis that the lesion had its origin from the cuspid or bicuspid and not from the lateral; and for the needed additional information for us to more positively determine whether suppuration could probably be controlled by treatment through the root canal, surgical procedure, or extraction. After examining the film, the pulp chamber of the cuspid, with the rubber dam in place, was opened and a dressing of three per cent. formalin placed in the middle third of the root canal and retained for twenty-four hours with cement.

At the second sitting the sinus was irrigated with a sterile solution of essential oil water until a considerable amount of the fluid passed through the root canal and out of the orifice of the tract located on the labial tissues in the missing lateral incisor area. I have always thought it better practice to sterilize the contents of the root canals before trying to establish a sinus, because I have seen cases of acute dento-alveolar abscesses resulting from efforts made to immediately irrigate the tract at the first sitting through a putrescent or septic root canal. Having established the tract, it was my custom many years ago to immediately fill the canals, but during the last twelve years, have delayed this process for at least ten days or two weeks; and in many instances longer, with the thought uppermost in my mind, it was far wiser to give nature this opportunity to close the sinus with new cells, than for me to fill it with any root canal material which was then, or is now, generally employed. This case has remained in a healthy condition for seven years, and skiagram No. 1 shows the case immediately after I had filled the root with chloropercha made from Gilbert's stopping.

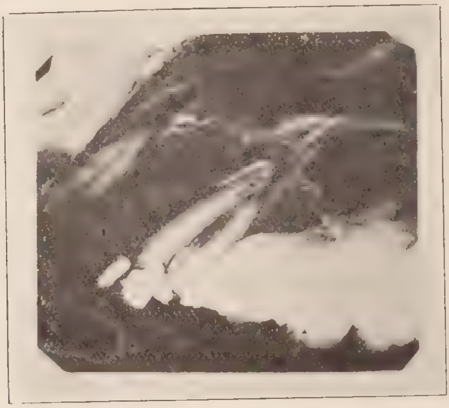

Fig. 1.

As the cuts for this paper were made from lantern slides they are necessarily all negatives. To read them correctly the white should be black and the black white.

TREATMENT OF A CHRONIC DENTO-ALVEOLAR ABSCESS WITH A SINUS

This involves cases where treatment through the canals, root amputation or extraction is not indicated, yet an opening into the periapical field through the buccal plate is demanded, if infection is to be controlled and the tooth retained.

This treatment of this class of cases is exemplified in slide No. 2, which is of a patient forty-four years of age, presenting with a chronic discharging sinus that was determined by a steel probe to lead to the root end of the second superior bicuspid, carrying a perfect porcelain crown. The skiagram shows a small amount of destruction in the periapical area and the root canal filling not passing quite to the root end. In this case an opening was made by enlarging the sinus through the buccal alveolar plate to a degree that would allow us to sweep a bur over the surface of the root until that portion of the tooth containing the faulty root filling was removed. Then the carious alveolar surface was similarly cared for until healthy tissues were reached. This case has been normal for the last two years. The technic of operation and details of after-treatment should be similar to those outlined under the heading of "Technic and After Treatment of Root End Reduction."

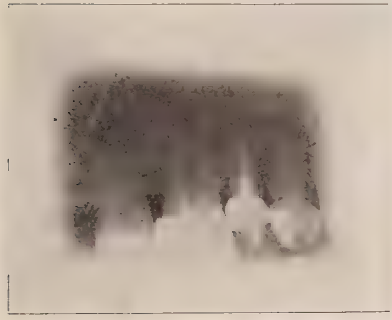

Fig. 2.

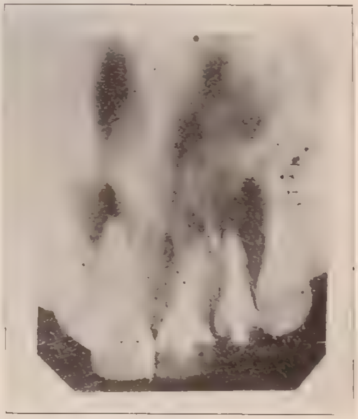

Fig. 3.

Slide No. 3 is of a case with a discharging sinus from a dento-alveolar abscess about the superior left lateral which had continued intermittently for the past four years. Root canal had been refilled once, discharge ceased and an artificial crown placed. In a few months the sinus was again re-established. Then an effort was made to control the chronic infection by drilling out the carious process, but naturally such a procedure in this instance could not cure the disease, for the good and sufficient reason that the denuded root end was left and the area posterior could not be properly reached with a bur or instruments entering the orifice of the sinus. A view of this case two months after the root was amputated is seen in Slide No. 4, showing the bismuth paste which had been carried into the part for the last time three weeks previous, and also the presence of a perfect root canal filling in the right central which was made by W. H. Dunne, since the first skiagram was taken.

In studying slide No. 5 one is confronted with the question, to what extent can apices of tooth be exposed by the destructive process following a chronic dento-alveolar abscess with or without a previous history of a cyst forming in this field or one developing subsequent to the initial acute infective process, and yet expect permanent results to follow root amputations?

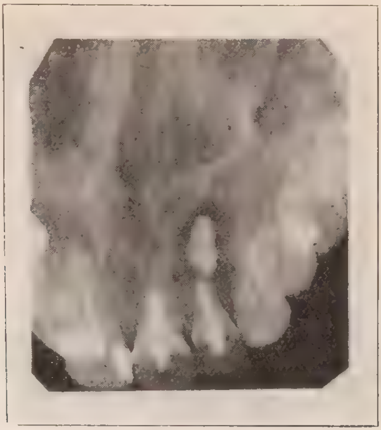

Fig. 4.

I believe one will not go far afield who confines root end amputations for the control of chronic infections complicated or uncomplicated with cyst formation, to the ten superior anterior teeth and now and then to the buccal roots of the superior molars and in rare instances to the anterior six inferior teeth, providing the tooth in question has not more than two-fifths of the apical pericemental attachment destroyed and the adjacent bone and alveolar loss in every direction from the root end is less rather than more than one-third the length of the root which is to have the end amputated. Therefore the essayist would say that root end amputation was indicated in the case depicted in slide No. 5, now upon the screen.

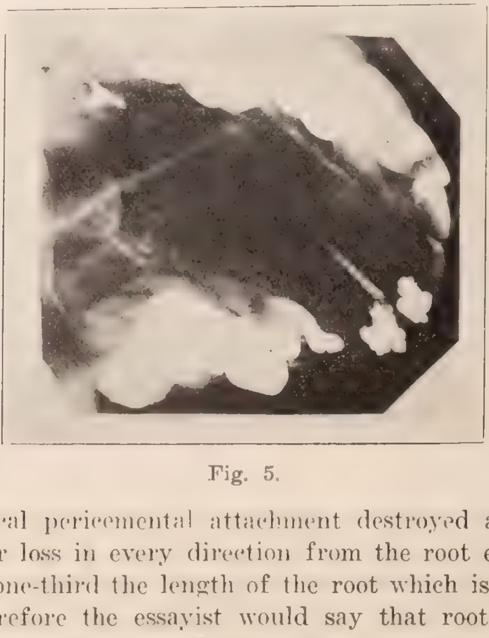

Fig. 5.

(To be continued)

PYORRHEA AND ITS SUBSEQUENT TREATMENT*

BY F. H. SKINNER, D.D.S., CHICAGO, ILL.

PREDISPOSING CAUSES

IN LOOKING FOR THE PREDISPOSING CAUSES of the disease we are about to consider, let us go back into ancient history for a short period.

From what I can learn about the skulls in the anthropological department of the museums, the majority of them show no destruction of the bony process, typical of the so-called "Pyorrhea Alveolaris" of today. As a rule, the skulls of the ancient Egyptians and Romans, as well as those of the North American Indians and cliff dwellers and the Alaskans show large, bell-shaped crowns, good alignment of teeth set in well-rounded alveolar process, and jaws large and heavy as compared with the jaws of the average adult of today.

The ancient adult's teeth show considerable wear, indicating thorough use of those organs in masticating hard and fibrous foods, which produced a stimulus for pronounced growth.

The jaws of the average adult of today are smaller, and the teeth have less contour, because our modern method of preparing foods requires little mastication and therefore demands less bony support for the teeth and less protection for the gums.

The up-to-date farmer recognizes the value of roughage in preparing a balanced ration for his dairy stock, but the human race is constantly seeking chemically pure foods without much waste or fibrous substance, something we can roll around the mouth, mash up between the tongue and palate, bite into a few times and then swallow, with the result that the more progress we make along this line the less the circulation of these parts is stimulated and the smaller the masticatory organs grow. These conditions have a great tendency to lessen vital resistance.

MALOCCLUSION

How few mouths we see in which occlusion is perfect. Dr. Pike, of Minneapolis, who is making a specialty of orthodontia, tells me that less than twenty-five per cent. of children at five years of age have perfect alignment of the teeth, and he showed me models of the mouths of children three years old in which irregularities had begun to develop. Very simple appliances correct these conditions at this age, and correct occlusion of the temporary teeth, in connection with the proper growth of the jaw, is reasonably sure to produce proper alignment in the permanent set.

Crowding of the teeth or lateral stress from malocclusion impairs circulation and produces lateral force on the alveolar process, which sooner or later usually results in lowered vitality, infection, chronic alveolitis, and, frequently, suppuration and pyorrhea.

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*Read before the Odontological Society of Western Pennsylvania, Nov., 1913.

TEETH AND SURROUNDING TISSUES

Just under the cementum is a thin, hard, dense layer, and just under this layer we reach large, open spaces known as "lacunae," which are filled, supposedly, with the same substance as the dental tubuli.

The cementum, or outer covering of the root, presents a rough, irregular, pitted surface, by means of which the pericemental membrane and dental ligaments and fibres gain a very firm anchorage to the root. The dental ligaments and bundles of fibres which support the tooth in the alveolus ramify in all directions, some going up into the gingivus and forcing the gums to cling tightly around the neck of the tooth. Their function is to protect the tooth at the cemento-enamel junction and prevent the introduction of infection into the tissues. Other dental ligaments and bundles of fibres anastomose through the tissues of the process, some fibres even uniting with the pericementum of the adjacent tooth. The general direction of these fibres is obliquely upward from the root to which they are attached, thereby forming a cushion, or sort of hammock, to support the tooth, with just enough play to prevent shock.

The inner portion of the alveolar process is a rather porous, spongy bone, perforated with many channels, known as Haversian canals, through which a rich supply of blood is furnished to the tissues supporting the teeth. The lingual and labial plates, as well as the parts which form the alveolus (socket for the tooth), are more dense. Mr. Arthur Hopewell Smith, of London, has termed this hard layer next to the tooth, which forms the walls of the alveolus, the "*linea madura.*" This can be detected very plainly in an X-ray picture. When this *linea madura* is once entirely destroyed, a tooth cannot be saved. Talbot, in his "Interstitial Gingivitis," speaks of the alveolar process as an "end organ," which would indicate poor return circulation, (another predisposing cause).

EXCITING CAUSES

Probably the most common cause of pyorrhea is lack of cleanliness in places which are difficult to keep clean. Putrescent food remains in one place for weeks, or even months, in the mouths of most young people, and even of some adults, and in this millions of pathogenic bacteria are cultivated, for an unclean mouth is an ideal incubator. The gums adjacent to this mass of organisms become inflamed, the dental ligaments lose their tone, the gingivus no longer hugs the tooth, but exposes the little ducts, or "glands of Serres" (Talbot), which line its inner wall, and infective organisms enter the tissue by this route and are carried up into the alveolar process, and according to the teaching of Dr. E. S. Talbot, osteitis, or interstitial gingivitis, is the result. The process then begins to break down, and the residue is carried to the pericemental membrane, where it is deposited as what we know as serumal calculus. The residue from the serous exudate which constantly oozes from inflamed gums also adds to the deposit. Then begins the destruction of the tissues which support the tooth.

The deposits usually form just under the free margin of the gums, but, in rare cases, form in other parts of the pericemental membrane, resulting in a pericemental abscess. These rough services abrade the soft tissues the same as sand paper would wear away cutaneous tissue, and thus expose sub-cutaneous tissue, resulting in infection, the different stages of inflammation and finally suppuration.

There are many other exciting causes of pyorrhea, such as food jamming between poor contact points; bands which do not fit the necks of the teeth and which lacerate the tissue or allow soft accumulations to gather under them, or bands which fit, but which have been driven up until they encroach on the dental ligament; bridge work which cannot be kept clean and metal fillings not properly smoothed down at the gingival third. Most of the silicate or phosphate cement fillings which I have seen are rough enough to produce irritation when in contact with the gum tissues, and pyorrhea is found, always, where a partial suction plate has been worn for any length of time.

There has been a good deal said about toothpicks, pro and con, one person advocating a quill and condemning a wooden toothpick, and his next door neighbor holding just the opposite views. If food has jammed between the teeth, I would advocate the quickest means of getting it out, whether with silk floss or toothpicks, using care not to injure the gums. In fact, I think rubbing the tooth surfaces and gently massaging the gums with a wooden pick is productive of good results, for it stimulates the circulation and breaks up and removes microbic plaques and other debris. The pernicious habit of systematically jamming a toothpick into the interproximal space, crowding the gum tissue down and then giving the pick a twist, thereby lacerating and cutting the gums, always should be watched for and stopped, for the little pockets formed by the recession of the gums from this cause are places where debris lodges, forming an ideal place for growing pathogenic bacteria, thus infecting the gums and producing inflammation which causes serumal deposits to gather, and pyorrhea will follow.

TREATMENT

Up to two years ago the only successful treatment was planing or scraping the roots to the hard surface, wherever the soft tissues had lost their attachment, followed with the best polishing possible and then with maintained cleanliness. If the work were thoroughly done, the congestion would disappear and the swollen tissues would recede to where they were attached to the teeth. If prophylaxis were kept up suppuration would not reappear. Of course, it is necessary, always, to splint all teeth lacking sufficient bony structure to support themselves. Any teeth around which the disease is incurable must be extracted.

PREVENTIVE TREATMENT

Since the introduction of the Dunlap vapor treatment my procedure has differed somewhat, and I am going to submit it for your criticism.

A great many patients, in whose mouths the gum tissues immediately surrounding the teeth show no inflammation whatever, have deep purple or red patches high up on their gums. This, Dr. Dunlop thinks, indicates osteitis, or what he calls interstitial gingivitis, and that it reduces local vitality and in a period of cessation of oral prophylaxis it would result in infection, suppuration and pyorrhea. The Dunlop vapor, if understood and properly applied, will reach these areas, and it, apparently, restores health to the alveolar process and gum tissues, and if recognized in time a great many cases could be prevented from developing into pyorrhea. Of course, periodical prophylactic treatments always are advisable. So much for preventive treatment.

MODERN METHOD

We will consider now a developed case of pyorrhea. First, remove all deposits which show above the gums and polish the crowns and necks of the teeth; also plane or file and polish all etched or roughened surfaces. Crowns, bridges or other things which will act as permanent irritants must be corrected. Then use the spray from a Dunlop vapor machine. The day after spraying, use the Dunlop vapor, cautiously inflating the tissues through the little ducts which line the inner wall of the gingivus, but do not place the needle into deep pockets. After that give a vapor treatment every three or four days for a period of from four to six weeks. In the meantime, teach the patient how to locate new deposits on exposed surfaces by the use of an iodin disclosing solution and small mouth mirror, and to use a hand polisher and tape for removing accumulations which gather. Patients are awkward when first starting to use this outfit, but practice makes perfect. I do not advocate vigorous rubbing of the gums with anything as long as any hard deposits are left on the roots, for it only lacerates the soft tissues. If patients will not try to keep their own mouths clean with a polisher and tape the dentist must see that the surfaces of all teeth are thoroughly polished as often as the disclosing solution indicates it is necessary, for a tooth brush never has kept teeth clean and never will, and it is essential to maintain cleanliness so as to prevent a reinfection during the healing process.

The vapor treatment stimulates circulation and reduces inflammation, and in a few cases deposits disappear and tissues reattach themselves with very little, if any, recession. In other cases it seems to have no effect other than to reduce the inflammation and make the patient's mouth feel much more comfortable. After four to six weeks of vapor treatment, if suppuration has not ceased, I begin surgical treatment of the roots. In some cases the deposits are very much softened, or else large chunks will break off with very little pressure. In these cases, I try not to injure the pericemental membrane, for we anticipate a return to normal condition and a reattachment of gum tissues.

This vapor has an affinity for diseased tissues, and it is surprising to see how it will penetrate both soft and bony tissue. I have introduced it into a cuspid and seen it come bubbling out from the inner wall of the gingivus of the third molar or even crossing the median line and coming out from the cuspid or bicuspid on the opposite side, apparently traveling through bony tissue from which, because of infection and inflammation, sufficient lime salts have been dissolved to leave it a porous, spongy diseased mass.

Red or cyanotic areas located well up on the gum tissues indicate osteitis or osteomyelitis and can be reached always and, good circulation can be re-established there, by the proper use of the Dunlop vapor.

SURGICAL INSTRUMENTATION

In some cases there appears to be no change in deposits or their attachments to the teeth. In these, thorough instrumentation is necessary. A good many of the so-called pyorrhea instruments on the market would make better chisels, gouges or scrapers than dental instruments, and a great many good men fall down in pyorrhea work on account of a selection of improperly-shaped instruments. In your essayist's opinion, the Younger instruments were the best instruments we had for a number of years for surgical work in pyorrhea, but they lacerate the tissues badly, and as a rule it is necessary to give hypodermic injections of cocain when using them. This usually produces soreness of the tissues, which may last for a few days or a few weeks.

Some years ago C. M. Carr perfected a set of one hundred and forty-four instruments fashioned similar to a Japanese plane. They remove a very thin shaving with each stroke and cannot be made to cut deeply and are adaptable to any shape of root or surface, except in the sharp angle where roots bifurcate, where a Younger instrument is preferable. When properly sharpened and used it is impossible to leave a rough surface with the Carr scalers. They cause so little pain that an anesthetic is seldom necessary, and all soreness usually leaves in less than 24 hours. To be successful in the surgical treatment of pyorrhea all etched or roughened enamel surfaces adjacent to soft tissue should be made smooth and be polished. Then all deposits should be removed and the dead pericemental membrane and irregular outer surface of the cementum should be planed to the hard layer. Care should be taken not to go through this hard layer for just underlying it are lacunae which, if opened up, leave hypersensitive surfaces which, most likely, will decay later on, and the lacunae are large enough to harbor millions of pus-producing bacteria.

Should the patient be negligent about his mouth and should deposits get started again, instruments which do not cut should be used on surfaces which have been planed once, for fear of going through the hard layer.

The little files known as "Smith trimmers" are probably the best adapted for this purpose. They soon lose their edge, thus eliminating the danger of cutting too deeply, and yet they will remove deposits from this hard layer. Dr. Tompkins, of Utica, N. Y., Dr. Hutchinson, of New York City, and many others have designed instruments which are adaptations of these files. They are much easier on the patient and handier for the operator, with which to reach obscure places, than the original set designed by Dr. Smith.

About 75 per cent. of the cases of pyorrhea can be cured by thorough instrumentation, and the Dunlop vapor will add twenty per cent. to this. I believe that where the Dunlop vapor has been used as heretofore described the results are better, i. e., the attachment of tissue will take place nearer the neck of the tooth and less instrumentation will be required to obtain good results.

The other five per cent. which do not respond readily to these treatments are complicated with some other condition and that condition must be diagnosed and properly treated. Intestinal toxemia frequently will keep up an inflamed condition of the alveolar process and gum tissue. Often, in cases of this kind, the oral condition will respond, immediately, upon putting the digestive tract in order, but more often the intestinal disturbance will disappear upon putting the oral cavity in order.

Dr. Dunlop claims his vapor treatment has produced beneficial results whenever he has used it in cases of diabetes, and the results I have obtained in the two cases I have treated during the last eighteen months seem to corroborate his claim.

One man, thirty-eight years of age, had been turned down flat by an insurance company. A year of rigid diet failed to eliminate the sugar. After four months of vapor treatment, whether that treatment or something else, he was cleared up entirely. Then he had another examination by a physician for an insurance company and was put on probation for two months during which time all tests showed a good condition. Then he was granted a $5,000 policy in one of the large insurance companies. He is beginning now to take a few liberties in his diet, but they seem to produce no bad results. The tissues still take the vapor a little, but not nearly as much as when I began his treatments. This man never had the first visible signs of pyorrhea, i. e., there never had been any relaxation of the dental ligaments, and the gum attachment formed as thin, pretty margins as one could wish to see, with absolutely no recession. Higher up they did not look quite up to tone, but before becoming acquainted with the Dunlop vapor I would have called it a perfectly healthy mouth.

Another patient, forty-four years of age, showed from four to five per cent. of sugar a year ago. Without any change of diet or habits of living, urinary analysis, for the last six months, has shown from nothing to one-half of one per cent. of sugar. He had pyorrhea when he came to me, but that was cleared up, apparently, the last time I saw him. I do not wish to be interpreted as believing that this treatment has any direct action upon the organs affected by diabetes, but I do believe that a great deal of slow systemic poisoning takes place from a diseased alveolar process and that by putting it in a healthy condition a big load is taken from the eliminating organs and thereby gives them a better chance to recuperate.

VACCINES IN PYORRHEA

Vaccines have proven very valuable in some cases, but it is necessary to determine just what the infecting organism is in order to get results with this treatment. The aerobic forms are easy to determine, but anaerobic bacteria are rather hard to diagnose and very difficult from which to make culture grow. Strictly anaerobic bacteria are quickly killed or driven from the alveolar process and surrounding tissues by the Dunlop vapor, because they cannot exist in the oxygen which we are able to throw into the tissues with this treatment.

The spirochaete pallida is a good example of this type. One patient who had been infected with this micro-organism seven or eight years ago has shown a negative Wasserman test for more than five years, yet there has been a chronic inflammation of the gingivus, and the slightest neglect has been followed by suppuration. The oral tissues cleared up within twenty-four hours after a vapor treatment, although the precaution of a few more vapor treatments was taken. No inflammation showed in the mouth for more than five months. After that length of time a few more vapor treatments cleared up the tissues again, but a blood test showed great deficiency in red corpuscles (anemia). This was corrected, and since then there has been no recurrence of inflammation.

There is one other form of chronic suppuration with which it is very trying to deal, i. e., where the gum hugs the neck of the tooth so closely that the pus burrows up or laterally into the process. These cases, sometimes, will respond to vaccine and vapor treatment, but it is necessary, usually to open the gum over the cyst located by an X-ray and curette all necrotic or carious bone, plane the roots thoroughly and pack cavity with gauze and euroform paste for twenty-four hours. Then keep cavity filled with Dunlop pocket packer or bismuth paste until tissue granulates in. Always be on guard when a deep pocket, through which you can run a probe to, or near, the apex of the root, develops at the side of one tooth when the rest of the mouth is healthy. Four times out of five it is an abscess and not pyorrhea.

SUBSEQUENT TREATMENT

Patients should be told, always, that pyorrhea, as a rule, is the result of neglect; that they will have to work harder than they ever have before to maintain a healthy condition after you have cured them, and that it is only with their co-operation a permanent cure can be maintained, because the same cause will produce the same effect again.

Patients are provided with a cotton roll carrier and a supply of cotton rolls, polisher, dental floss or tape, mouth mirror and iodin disclosing solution or the formula.

Formula of iodin disclosing solution:

Iodin Crystals	50 Grs.
Potassium Iodid	15 Grs.
Zinc Iodid	15 Grs.
Glycerin	4 Drs.
Aqua	4 Drs.

Mix. Put up in glass-stoppered bottle.
Sig. Paint two or three teeth at a time.

Rinse immediately with water. All places stained with this solution are foreign substances and should be removed.

Cotton rolls are used in massaging the gums and wiping debris from the teeth, cheeks, gums and roof of mouth. The handle end of the instrument which I prefer for holding these rolls can be used as a tongue scraper.

While the tooth brush is, in a large measure, a failure in preventing decay and pyorrhea, I am not quite ready to eliminate it as a toilet article, but am rather particular as to just how and when it is used.

Teach the patient, in handling a brush, to begin brushing always on the grinding surfaces of the back teeth with a backward and forward and side to side motion which is to clean the fissures. Then place the brush well up on the gums, and with a rolling motion brush toward the occlusal surface, i. e., up on the lower and down on the upper teeth, on both lingual surfaces. Never allow the bristles to prick the gums, for tooth brush bristles always carry infection. When brushing the lingual surfaces of the lower molars, the tongue should be drawn well back so as to expose those surfaces of the teeth to the brush. Frequently, I give a demonstration, showing the patient how to use a brush, and then have him practice before me until he uses it properly.

It is a very common thing for a patient always to start brushing in one place, usually at the gingival margins of some of the anterior teeth. This should be watched for and stopped, for while few do too much brushing, the brush is stiffer always when first put into the mouth, and this, in connection with the first grit, if an abrasive is used, applied in one place year after year, is sure to cause gum recession and to wear through the thin enamel of the gingival third.

I recommend rather small brushes of medium texture, and for lingual surfaces of anterior teeth a small brush which can be used with a rolling motion, because the ordinary-sized brush bridges over the inside of the arch. I do not like the lingual surface brushes which are used as a hoe, for they are sure to prick through and thus infect and injure the gum tissues. Enough brushes should be kept on hand all the time so that each brush is used only once in twenty-four hours, and the teeth and gums should be brushed after each meal.

The chief benefit derived from the use of a tooth brush is the removal of some of the loose debris and the healthy condition of the gums obtained from massage, but massaging with a tooth brush can be carried to excess. I do not like to see hard, leathery, light pink gums, which have been rubbed until their surfaces resemble a hard callous, for there is not good circulation in them and heavy serumal deposits will gather under them usually and work root-wise. Gum tissue should have a good, bright, healthy color, in which a net work of fine blood vessels, or capillaries, show plainly, just underlying the surface. I do not mean hyperemia, but just a good healthy circulation.

So far as I have been able to observe, daily massaging with the cotton rolls increases circulation, but does not cause the gums to become calloused. If a brush is handled improperly it does as much, if not more, damage than good.

When standing before a large mirror, a patient can locate foreign substance on the teeth by applying the disclosing solution and using a mouth mirror. Polishing with the wooden points usually removes debris located by the disclosing solution, but where necessary, the patient is allowed to use a fine grit, such as precipitated chalk or even a fine silex preparation. I do not advise the use of pumice, and in my practice have not used any of it for over two years, for it does not put on the high polish necessary to inhibit plaque formation.

Some patients are able to maintain a healthy condition for six months or even longer, while others, who will not try or haven't the ability to do good work, have to be seen every thirty days. We must find out the length of time they are able to keep their mouths in good condition and then establish that as a period for prophylaxis treatment.

The suggestions in regard to the results of the Dunlop vapor treatment, herein recorded, are based simply upon clinical experience, but I submit the following theories for your discussion.

Dr. Loeb, in his recent book, "The Mechanistic Conception of Life," says: "Life of warm blooded animals, man included, ends with cessation of oxidation in the body.

"As soon as oxidations have ceased for some time, the surface films of the cells, if they contain enough water and the temperature is high, become permeable for bacteria, and the body is destroyed by micro-organisms."

What more favorable place for the breaking down of tissue cells can be found than in the congested areas of the alveolar process and gum tissues where there is body temperature, moisture and lack of oxygen? The Dunlop vapor furnishes oxygen to these congested parts, promotes normal cell activity and thereby growth. It immediately restores the bright red color to cyanotic tissue and stimulates circulation, thus supplying food for the newly-formed cells to exist upon. By pressure, it forces micro-organisms and their by-products out into the healthy tissues, where the leucocytes have a chance to combat them, and wherever it carries them it also places the borated oxygen, thereby adding to the vitality of the parts. This, if not carried to excess, should have the effect of autogenous vaccine, which produces anti-bodies. These increase the number of leucocytes and raise the opsonic index against the infecting organisms.

I realize that this paper is subject to criticism, but I have outlined the treatment and results of experience in my practice in hope that it will stimulate those who have not already taken up this work to do so, for every dental practitioner should be a specialist in pyorrhea and oral prophylaxis, and if he is treating pyorrhea, he cannot help but study the conditions which cause the disease, and if he learns to recognize and remove the cause of dental pathological conditions he is practicing oral prophylaxis.

Efficiency is the watchword of the day. Corporations pay experts thousands of dollars annually to show them how to decrease expenses and increase the output. Many of our leading baseball managers already recognize the value of keeping the mouths of the players healthy by taking a dentist to the spring training camps, all to promote efficiency. Forty per cent. of the absences from our public schools are caused by diseased mouths and teeth, and over forty per cent. of teeth lost by adults are lost from pyorrhea.

A clean, healthy mouth promotes a higher moral, mental and physical development and commands more respect the world over. Oral prophylaxis teaches us to look for and remove that which causes oral pathological conditions, and in no place does the old saying, "a stitch in time saves nine." prove truer than in the human mouth. So, gentlemen, let us see to it that we are all practitioners of oral prophylaxis.

DISCUSSION.

Dr. Litchfield: I appreciate very much the honor of being asked to address you, as well as the kind words with which your chairman has introduced me. It is very agreeable to hear words of appreciation from a dentist, because a physician who tries honestly to see that his patients' teeth are properly cared for is too apt to be considered by the dentists as a meddler. Granting that there is as much, or perhaps more, incompetence among physicians than there is among dentists as regards oral prophylaxis, I wish to claim for physicians the right to make suggestions to their patients' dentists when they find evidences of pyorrhea, when they find faulty bridge work (bridges which cannot be kept clean, which do not serve their purpose because of faulty occlusion or no occlusion, and bridges which are anchored in such a way as to produce irritation), and when they find crowns which are not sufficiently well-fitted to prevent the accumulation of infectious matter under their borders or which have been put on teeth which need further treatment. When a physician sends a patient back to his dentist, saying he can do nothing for him until the dentist cares for the pyorrhea, and the dentist replies that he can do nothing for the pyorrhea until the physician puts the patient's general health and resistance on a higher plane. the dentist's position is based on a hypothesis that the pyorrhea is due to a disordered condition of other parts of the organism, but the physician is complaining of something which is in plain view and which can be demonstrated to anyone.

Pyorrhea is not diagnosed because its importance is not yet appreciated either by the rank and file of your profession or of mine. It is remarkable how able physicians overlook pyorrhea daily while making the most exhaustive and scientific examinations of the nose, the mouth, the adjoining organs and the accessory sinuses. I might cite as an illustrative case a high school boy who was brought to me from out of town because his breath was so offensive that he was shunned by everybody; his school life was made a burden to him and he had no playmates. His uncle was a practicing dentist and had charge of the boy's mouth. He had apparently never appreciated the fact that the boy had pyorrhea and of a particularly fetid variety. Neither had various physicians to whom the boy had been taken, rhinologists, laryngologists, and stomach specialists. Tonsils and adenoids had been operated on in the hope of relieving the distressing condition; the nose had been persistently treated with various sprays; stomach and bronchial tubes had in turn been blamed for the offending stench and treatment had been adapted to these hypotheses. None of these men noted the pyorrhea which was so very evident, because they had not learned its importance and were not accustomed to look for it. The odor and appearance were so characteristic that, to anyone acquainted with the subject, a diagnosis should have been instantaneous.

It seemed to me that Dr. Skinner was a little severe in his arraignment of the tooth brush and also that his method of caring for the teeth made greater demands on patients' time than would be given except in the rarest instances. I think you are doing very well if you can get your patients to brush their teeth properly three or four times a day. And how few of you instruct your patients as to the proper brush and how it should be used. After more than forty years of almost continuous treatment by dentists, it was only last September that I was taught how to brush my teeth and how to reach the posterior surfaces of the last molars. That was by a distinguished prophylactic dentist of Philadelphia whom I had asked to take part in a symposium before our State Medical Society.

As to those diseases which are associated with pyorrhea, we do not know yet whether the diseases are the result of an infection which has gained entrance to the system through the infected gums, or whether the infection of the gums and alveolar processes has taken place because the resistance to bacterial infection has been lowered by constitutional disease.

It will require a great deal of careful, conscientious co-operative work by your profession and mine to solve these problems. I believe that every general hospital should have several competent dentists on its staff. At the present time I am furnishing blanks to any dentist throughout the country who will co-operate with me by filling out one of these blanks for each case of pyorrhea that appears in their offices. I feel that if we can get several thousand of these sheets, the information which they will give us will be of real value. They refer particularly, as you will see, to gastric conditions, conditions of the joints and of the heart. I have been moved to take up this question by noticing that practically every case coming to me with symptoms of hyperacidity or of gastric or duodenal ulcer present more or less evidence of pyorrhea. Another disease which is frequently associated with pyorrhea and very probably is caused by pyorrhea, is tic douloureux. Dr. Skinner has referred to diabetes and the frequency with which pyorrhea is associated with that disease. There is no question but that a proper treatment of pyorrhea would improve a patient's condition under any and all circumstances. Whether or not it would have a direct, specific action on diabetes mellitus would require more extended study and the accumulation of a larger series of cases. According to the paper which I had the pleasure of hearing Von Noorden read in London last August, diabetes mellitus consists in an abnormally excitable condition of the sugar-producing function of the liver, due to unknown causes but influenced directly by several of the ductless glands, the internal secretion of the suprarenal glands, for instance, stimulating this excitability of the liver, while the internal secretion of the pancreas diminishes it. It is very easy to imagine that toxic products circulating throughout the system from the hotbeds of infection which exist in a pyorrhea alveolaris might affect the liver directly and, by affecting the ductless glands, might influence the function of the liver indirectly.

PYORRHEA

....

Dentist's Name Date

....

Patient's Name, Initials, or Number. Sex Age Occupation, with special reference to lead, phosphorus, mercury.

Amount of pyorrhea................................ Duration................

Have you had any trouble with your digestion?................How soon after eating?................

Have you had any pain in your abdomen?................Where?................

How soon after eating?................................

Have you had any tenderness in your abdomen?................Where?................

How soon after eating?................................

Which was noticed first—trouble in the mouth or in the stomach?................

Have you had any heartburn?................acidity?................water brash or regurgitation?................gas in stomach?................fullness and discomfort?................feeling of working, seething, boiling up, etc.?................

How soon after eating?................................

Do you notice an excess of saliva in your mouth about 1 hour after meals?................

Is there nausea?................Vomiting?................

Is the vomited matter bitter or sour (acid)?................

Have you tendency to diarrhea or constipation?................

Do you use laxatives?................What?................How much?................

Have you ever vomited blood or material resembling blood?................

Have you ever passed in your bowel movements, blood, tarry material or material resembling coffee grounds?................

Are you ever wakened during the night or early in the morning with "hungry pain" which is only relieved by taking food?................

Did you ever have tonsilitis?................How often?................Last attack?................

Did you ever have rheumatism?................How often?................

What kind—chill?................fever?................inflammation of several joints?................

Did you ever have gout?................How often?................

Are you troubled with shortness of breath or palpitation on exertion?................

Have you had appendicitis?................Operation?................

Have you had gall stones?................Operation?................

Are you fairly conscientious in masticating your food before swallowing it?................

Do you use tobacco?................How much?................

Do you use alcohol?................How much?................Ever before breakfast?................

Are you taking medicine continuously for any chronic trouble?................What?................

Have you suffered from boils or carbuncles?................Where?................

When?................ How much?................

VACCINE THERAPY IN PYORRHEA ALVEOLARIS

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INFECTION.

BY THE TERM INFECTION we mean the manifestation of disease caused by the entrance of micro-parasitic organisms into the body and their multiplication and action therein.

Disease is not always produced, although the presence of organisms may be demonstrated on or in the body, as large numbers of bacteria are found on the skin, beneath the nails, in the oral cavity, etc., and yet the body may not suffer from their presence. It seems then that infection will depend upon certain conditions. These conditions may be classed as those conditions which depend upon the tissues of the individual attacked and those conditions peculiar to the organisms themselves.

CONDITIONS WHICH DEPEND UPON THE INDIVIDUAL ATTACKED.

The difference in the resistance of individuals may be attributed to a number of conditions. The most important of these conditions I believe to be found in the character of the hard and soft tissues, the amount of protective elements present in the blood serum, the general health of the body and the repair of the teeth.

Some individuals are immune from certain infections; you no doubt can call to mind such instances. This is not only true of systemic diseases but is likewise the case in certain local pathological conditions. Some tissues and organs of certain individual's seem to have in one case a peculiar immunity, while in another case a particular susceptibility. There is no question that the tissues of the oral cavity of some individuals are more susceptible to the attack of micro-organisms and irritants than others.

The amount of protective elements present in the blood plasma is a fairly good index to one's power of resistance. These elements are: antitoxins, lysins, agglutins, percipitins, and opsonins. These antibodies either act independently or in conjunction with the phagocytes.

Even after the natural barriers of the body are passed, i. e., the skin and mucous membrane, the invading bacteria are still further combated by the above-mentioned protective elements of the blood.

Different species of bacteria are combated by specific antibodies. This depends upon the peculiar properties of the invading organism. Certain species of bacteria secrete an exotoxin, while other varieties possess an indotoxin. Among the first class may be mentioned the diphtheria bacillus. This organism secretes a toxin which is very poisonous to the tissues of the body. This infection is combated by the antitoxins of the blood plasma.

Among the second group of organisms may be mentioned the staphylococcus and streptococcus micro-organisms. While these organisms have an endotoxin, yet their indotoxin is much more deleterious to the tissues. These organisms are combated principally by the opsonins in conjunction with the phagocytes.

The typhoid bacillus is mainly destroyed by the agglutins. Hence you observe that each invading specie of organisms calls forth specific antibodies.

A high content of protective elements would be indicative of a high opsonic index, while a low content would mean a deficiency of normal resistance.

CONDITIONS DEPENDING UPON INVADING ORGANISMS.

In order to cause an infection the organisms must multiply sufficiently and produce substances which are poisonous to some or all tissues of the body.

This power differs with different species of organisms. It would take a great many more pneumococci to produce pneumonia than tetanus bacilli to produce lock jaw. The power of organisms being able to multiply rapidly and produce toxic products which are injurious to the body tissues, determines their virulence. This property controls the pathogenicity of bacteria. Organisms may be identical both culturally and morphologically; they may appear alike under the field of the microscope, yet they may differ widely in their virulence and pathogenicity. This property is of considerable importance since all organisms do not possess this property, while they may have the power to multiply rapidly but do not produce toxic products sufficiently to cause disease. This fact is demonstrated by the large number of saphrophytic bacteria which are present in different parts of the body especially in the oral cavity. Yet no infection is produced and the only harm which they may cause would be mechanical owing to their enormous numbers.

Staphylococci aurei differ widely in their pathogenicity. Some varieties when injected intraveinously into susceptible animals cause very little disturbance, while other varieties cause death in eight to twelve hours.

The staphylococcus pyogenes pyorrhea is an attenuated form of the staphylococcus pyogenes aureus and is less pathogenic than the staphylococcus pyogenes aureus found in abscesses and other localized infections.

This may be accounted for on the theory that, owing to the large number of species of organisms present in the mouth, an antagonism of organisms may exist.

*Another factor to be considered in connection with the immunity of the oral cavity to infection may be antagonism of organisms to one another. The experiment carried out by Miller on himself throws light on this question. He thoroughly rinsed his mouth with a buillon culture

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J. F. Colyer, ''Dental Surgery and Pathology,'' p. 674.

of bacillus prodigiosus containing over two billion bacilli. The number of bacilli in a loop of his saliva was ascertained at the beginning of the experiment. His mouth at the end of three hours was practically free from the organisms.

The invasion of the tissue by staphylococcus in one case may be manifested only by a slight redness and inflammation, while in another case extensive ulceration and swelling may take place. This difference of pathogenicity depends upon the difference in virulence of the invading organisms.

COURSE OF INFECTION.

After the invading organisms have passed the natural barrier, the mucous membrane, an infection may not be produced but the organisms must have the power to multiply sufficiently and produce toxic substances injurious to the surrounding tissue. The bacteria must penetrate the tissues to some extent and there must be a sufficient interval for the multiplication of organisms. This time between the invasion and the appearance of signs and symptoms of disease is known as incubation period. This period varies with different species of organisms according to the biological properties of the micro-organisms—their power to multiply and produce toxic substances. The length of time required for an infection may also be influenced by the resistance of the tissues at the point of invasion and the opsonic index of the host.

The spread of an infection depends upon the specie of the invading bacteria and the anatomical structure of the tissues at the point of *locus minoris resistentiae*. Staphylococci are present in local infections and rarely cause general infection of the blood. The diphtheria bacilli remain localized but produce a toxin that affects other tissues of the body.

In many instances there is a low resistance at a local spot as is found in pyorrhea cases. This local predisposition affords the *locus minoris resistentiae*, which presents a portal for entrance of pathogenic bacteria.

The damage done at the point of infection varies with the pathogenicity of the invading bacteria and the anatomical structure of the surrounding tissues. A pyorrheic infection is characterized by a low-grade inflammation and pus formation, but a very slow destruction of tissue, as many cases of pyorrhea are known to have existed for years before the teeth were exfoliated.

GENERAL CONSIDERATION.

Pyorrhea is a disease of the tooth's socket which gradually destroys the tooth's attachment. The disease is manifested by a slow necrosis of both the hard and soft tissues surrounding the teeth. This destruction of tissue is due to the action of pathogenic pus-producing bacteria.

While we may not say that this disease is of specific bacterial origin, yet we must admit that micro-organisms hold a conspicuous part in the maintenance of the disease.

Dr. Leon S. Medalia in a paper read before the National Dental meeting in 1912, said, as to the causes of pyorrhea, "I found that the mechanical causes are by far the most important in starting the disease, but on a whole less so in keeping it up, while the local infection, on one hand, was more important in the maintenance of the disease.

Medalia* has been experimenting for some time with the use of vaccines in the treatment of pyorrhea alveolaris. He reports 115 cases treated by this method, the majority of which were either cured or greatly benefited. The bacteriological examinations of the pus from such cases did not differ materially from the organisms found in normal mouths. He claims that the injury done to the gum tissue by the various irritants lowers the resistance of the tissue and an infection takes place. He claims that in ninety per cent. of the cases examined microscopically the pneumococcus associated with the staphylococcus are the principal infecting organisms. The injections range from 30,000,000 to 150,000,000 pneumococci, combined with from 150,000,000 to 500,000,000 staphylococci aureus bacterin. In another report he has had thirty-three patients under treatment, eleven of whom are entirely cured; five of these have remained over a year without any recurrence. All of the others have shown great improvement, such as disappearance of pus, loose teeth becoming firmer, gums regaining their pinkish color and elasticity and when present pain practically always relieved. Patients suffering from pyorrhea who are also troubled with rheumatic pains in joints and muscles have shown great improvement in their rheumatic symptoms. At the same time their local condition has improved.

Goadby§ reports forty-seven cases of pyorrhea alveolaris treated with bacterins. Of these thirty-six were cured; that is, all the general symptoms—anemia, toxemia, weakness, and chronic intestinal dyspepsia—cleared up, together with the local suppuration. Nine of the cases were relieved; that is to say, the general symptoms disappeared, although the local discharge remained.

Leary†, in an article on the bacteria of pyorrhea alveolaris, states that he has studied about one hundred cases of pyorrhea and has found a great variety of organisms. The staphylococcus was commen, but usually associated with other organisms.

Edward C. Kirk‡ says, in regard to the treatment of alveolar pyorrheal infections having a systemic predisposition, that it is a fundamental axiom of therapeutics that the cure of a disease must involve a removal of the cause. As the cure of suppurative inflammatory lesions of the retentive structures of the teeth, due to the impingement of tartar as a traumatic predisposing cause necessarily involves the thorough removal of tartar deposits as a prerequisite to successful local treatment of the inflammatory lesion, so also in pyorrhea alveolaris, due to constitutional malnutrition, treatment of the local lesion is without permanent curative effect until the underlying systemic fault has been effectually corrected. The mere routine local treatment by scaling and the application of antiseptic, stimulant, escharotic, or astringent drugs is of but temporary benefit; indeed, misdirected or ill-judged routine local treatment may do positive harm in cases of this class. A large proportion of pyorrheal cases having a constitutional predisposition, cases of the most intractible class have practically no tartar deposits whatever upon the roots of the teeth, and yet the empiric to whose mind tartar and pyorrhea are interchangeable terms, subjects such teeth to a vigorous application of the scaler to scrape the roots smooth even when no tartar is to be found upon them. Such ill-advised treatment wrongs the gingival tissues, increases the opportunity for further infection, and lessens the already weakened resistive power of the local tissue area involved. Careful exploration with a suitable, delicately-fashioned, exploring instrument should be made to first determine the presence or absence of tartar deposits before any further attempt at scaling in these cases is made. Where tartar is not the obvious cause of pyorrheal lesion, careful study of the character of the local gingival conditions should be made, the quantity of the pus flow should be noted, and the extent of atrophy or rarefaction of the alveolar borders determined.

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*Mulford's Working Bulletin, No. 7.

§Goadby: Lancet, 1909, Vol. I, p. 52.

†Leary: *Dental Cosmos,* 1910, Vol III, p. 52.

‡Kirk: American Text Book of Operative Dentistry, pp. 506, 509.

When the lowered resistance of the patient is mainly due to absorption of toxins, and when the resulting malnutrition is not due to specific constitutional disease, prompt and permanent restoration of the infected gingival tissues to health may be brought about by the judicious application of vaccine therapy. This method of treatment has proved satisfactory in a fair proportion of otherwise intractible cases.

Dr. George B. Harris* said in respect to experiments with virulent and attenuated forms of staphylococcus albus and aureus that he did not believe pyorrhea to be caused by true albus or aureus, but rather by an attenuated form of these, and possibly other organisms. Cultures obtained from acute abscesses and cases of true pyorrhea were incubated at the same time; clusters of each were then put in separate test tubes containing sterile water. They were then counted and diluted until each one contained 1,000,000 to the cubic centimeter. One-half of 1 cc. was then injected into a guinea-pig and the same amount from another tube into another pig of the same weight. The pig that received the injection from the tube containing the bacteria obtained from the abscess died within twenty-four hours before the other. Repeated experiments gave the same results; the virulence of the one was found to be nearly one-third greater than that of the other. There is also a difference in the growth of the two strains: (1) The one is more rapid in growth, (2) it resists various antiseptic agents longer, and (3) cultures obtained from true cases of pyorrhea are much more difficult to separate from the agar, and it is more difficult to break up the clusters in the centrifugal machine.*

It is my belief, based upon a number of experiments, that the staphylococcus pyogenes aureus is responsible for the damage done in pyorrhea cases. For a further discussion of this subject, see March *Oral Hygiene*, 1914.

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*George B. Harris at National Dental Association, Washington, 1912.

ANALGESIA IN DENTISTRY*

BY E. I. McKESSON, ANESTHETIST, TOLEDO, OHIO

IN THE BEGINNING, let me give you my personal experience with N_2O and O analgesia from the standpoint of the patient. While other patients may show some variations, still these experiences seem to be sufficiently common to others to be considered the usual.

Recently, while taking analgesia for cavity preparation. I took great care in making a mental record of just the sensations I experienced while the work was being done. After I had taken four breaths of nitrous oxid and oxygen. a sensation or wave of warmth passed over me, followed in two breaths by huskiness of the voice, which was soon followed by a thick, large sensation. At this moment the bur was applied to the cavity but it was still sensitive. During the next eight or ten breaths a slight tingling of the skin with a tired, relaxed feeling developed.

In order to test the progress of analgesia, the doctor requested me to bite my finger; we both noticed that it missed my mouth, and I found it was numb, so he began work.

At the point where the pain was sharp before, the bur now gave a sensation of warmth, but not disagreeable. As the analgesia deepened, the doctor seemed to be farther away, and the sounds which a moment before were exaggerated now seemed to quiet down. At this moment the air valve was opened a little wider to prevent further advance of analgesia. Now, I had developed a general feeling of numbness, apathy, and indifference. Even the sensation of warmth was now completely suppressed. although I answered questions and was perfectly rational. Time passed slowly.

At another time I took nitrous oxid and oxygen nearly to anesthesia (but without loss of consciousness) for the removal of adenoids. As a guide for the time to operate, I decided to inhale the anesthetic until the panels of a door which I was looking at, became blurred. At that moment I removed the face inhaler, held my breath so as not to dilute the analgesia, and opened my mouth for the operation. I felt a pressure on the posterior pharyngeal wall from the curette, and later, the warm blood running down my throat, but there was no pain whatever, and I recovered completely in about five minutes.

In the latter case I was nearly anesthetized since my vision was disturbed, which is one of the last of the special senses to surrender to anesthesia.

The state of analgesia is made possible by the fact that, in the development of general anesthesia, the first special sense to surrender is the sense of pain, leaving the other special senses *less* influenced. Loss of consciousness has been arbitrarily set up as the dividing line between analgesia and anesthesia; but the one may merge so gradually into the other that if the eyes are kept closed from the beginning, and no work is attempted, it is impossible to determine the moment when consciousness is lost. When all the special senses are gradually subdued it results in sleep. The depth of analgesia obtained is in proportion to the concentration of the nitrous oxid in the nitrous-oxid-air-oxygen mixture, and this gradual merging into anesthesia is put to practical use, not only in meeting the variable intensities of pain, but in obtaining mental lethargy.

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*Read before the Northern Indiana Dental Society, 1913.

In its last analysis the technic for giving nitrous oxid for analgesia consists in diluting the gas with enough air and oxygen to prevent loss of consciousness, on the one hand; and yet of sufficient concentration for the relief of pain, on the other. It is necessary, however, to master many details in technic to secure satisfactory results. First of all, it is necessary to recognize the limitations of analgesia; nor to attempt the removal of a live pulp nor an extraction under its influence; not to expect that analgesia unaided by suggestion will make a fearless patient out of a fearful one. But if the sensations produced in securing analgesia are also utilized in strengthening mental suggestion, success will be obtained. Every operator, of course, will develop his own line of suggestions to meet the requirements of the particular patient. Probably he will exert his greatest influence in the way of suggestion by his actions, which should inspire the patient with the fact that he ''knows his business.'' Many successful operators tell their patients the sensation that will be experienced just as it is coming on, and keep up a line of light conversation through the entire operation.

The second point to be understood is in regard to the air and oxygen used to dilute the nitrous oxid.

Years ago nitrous oxid anesthesia was limited to short operations, because we did not use oxygen with it. Later they tried to prolong anesthesia by using air as a source of oxygen supply, but too much air had to be used to get the required amount of oxygen, and anesthesia could not be obtained on account of the high dilutions of N_2O with air. The use of pure oxygen with nitrous oxid today makes anesthesia of a prolonged nature not only possible, but the safest and best known.

In analgesia we do not use as much nitrous oxid and so we are permitted to dilute with air, but we will need pure oxygen also. Why? Because the amount of oxygen obtainable from the air even in analgesia is insufficient to eliminate the element of asphyxia in all cases. During the administration of anesthesia for more than four thousand prolonged surgical operations the writer has made frequent blood pressure, pulse and respiration determinations during each of these cases. I find that asphyxia is the only common cause for the elevation of blood pressure during an anesthetic. Eliminate asphyxia and blood pressure does not rise with nitrous oxid and oxygen properly administered, nor does it appreciably fall. In analgesia we want to continue the administration for considerable periods, and we do not want blood pressure disturbed.

How much oxygen is necessary to eliminate asphyxial symptoms which are: rapid respiration, cyanosis, dilated pupils, elevation of blood pressure and slowing of pulse? Every patient has his own standard, and it is impossible to tell, before anesthesia, the exact mixture which will just eliminate asphyxial symptoms in a given case, but there is a general rule which is usually true that the alcoholics, arterio-sclerotics, muscular, and obese patients require considerably more oxygen than others, and that poorly nourished, anemic patients require less oxygen. There are patients who do well on as small an amount of oxygen as seven per cent., while others, apparently in the same degree of health, may require as much as twenty per cent. None require more than is in the air (twenty per cent.), unless they are suffering from an acute circulatory embarrassment or a general toxemia, such as is seen in acute peritonitis.

In analgesia we can always get twenty per cent. oxygen, if we use pure oxygen in our apparatus, but we can never get twenty per cent. if we dilute the N_2O with air only, since the air itself contains only twenty per cent.

It is a matter of economy to dilute the N_2O with the air, and thus obtain as much oxygen in that way as possible, but it is never possible to get enough to always be on the safe side without using pure oxygen also. We are safe only when using a total of from eighteen to twenty per cent. oxygen. For example, the average case takes one-third gas-oxygen and two-thirds air to produce analgesia. The air taken furnishes two-thirds of twenty per cent. or thirteen per cent. of oxygen. The other seven per cent. necessary is obtained from the pure oxygen supply in the apparatus. The alcoholics, the apoplectics, the plethoric and obese patients, who require more gas and less diluting air to produce analgesia, are also the class which require a full supply of oxygen; so as the *air* is cut down to secure analgesia, the pure oxygen must be increased in proportion.

Now, we might use pure oxygen entirely as the diluting gas with as good results, but there would be no advantage gained and the cost of analgesia would be greatly increased. The erroneous idea that pure oxygen causes excitement, you may disprove once and for all for yourself by sitting down to an apparatus and inhaling the contents of a whole tank full without a breath of any other gas; breathing normally, of course.

In a particular patient, we may have certain disease conditions such as diabetis, nephritis, pneumonia, pulmonary tuberculosis, etc., which would contraindicate the administration of an anesthetic such as ether if the operation were trivial, the removal of a scar for cosmetic purposes, for example. But if the operation were a life-saving procedure we recognize no contraindication, give it, and take the chances even with ether if it is not possible to get the better anesthetic.

In administering N_2O and O analgesia it isn't necessary to take any chances with the safety of our patients, for it is in our power to eliminate absolutely the only danger—asphyxia.

Our third consideration will deal with the technic in detail.

Slight variations in technic are necessary in using the various forms of apparatus now on the market. What I shall have to say in this portion of my paper will have reference to the particular technic used in the clinic to follow.

The best time to administer analgesia is from three to four hours after meals. All tight clothing should be loosened. and the patient should be comfortably seated in the chair with the headrest well forward, tilting the chin slightly downward to discourage oral respiration when the mouth is open.

Before applying the nasal inhaler, the bags should be only one-half filled with their respective gases. so that there will be no forcing of gas onto the patient. If the automatic attachments are used, one need only to open the tank valves wide open when the bags will be kept one-half filled without attention during the operation.

The mixing valve is set for seven per cent. O and ninety-three per cent. N_2O from the beginning. and usually this mixture is not changed throughout the analgesia.

The nasal inhaler is now applied and adjusted to fit snugly and in such a position that respiration is free. The breathing tube is then brought up between the pads of the headrest and connected with the inhaler so that if the patient leans forward the inhaler will not be dislodged. Make sure the inhaler does not allow air to leak in under it. If the patient is an adult, the re-breathing bag is set for one-half the volume of tidal respiration; if a child, it is set about one-half its respiratory volume, depending upon the child's age.

As the patient begins to inhale the gases we may follow one of two methods for inducing analgesia—a rapid method. or a slow method. To *quickly* secure analgesia in from six to twenty breaths, keep the air valve closed until analgesia is established, then open it partly and begin operating. The slow method starts the patient with the air valve about one-fourth open and requires from four to six minutes; when analgesia of the desired depth is secured it is opened a little wider and the operation is cautiously begun while the patient continues to breathe through the nose. If the mouth begins to close. the eyelids droop and answers to questions are sluggish, the patient is on the verge of anesthesia, and the air valve should be opened a little wider; or, on the other hand, if the patient indicates pain the air valve is closed a little. This constitutes the manipulative part in the control of the apparatus in most cases.

If anesthesia is desired, close the air valve for a minute or two and cover the mouth with rubber dam. the hand. or a quartered hollow rubber ball to keep out the air, the depth of anesthesia being controlled by the percentage of oxygen in the mixture.

RE-BREATHING

Re-breathing is being practiced almost universally in nitrous oxid and oxygen anesthesia and analgesia.

My reasons for using the re-breathing method are fourfold:

1. To prevent over-ventilation of the blood (by rapid or deep breathing) thus reducing the elimination of CO_2 by the lungs to its normal, and combating shock.

2. To stimulate the shallow breather to take full-size inhalations, thus increasing the gas absorption in the lungs, and securing desired results which might be more or less unsatisfactory without it.

3. To prevent the waste of gas which has not reached the deep portion of the lungs and has not been used, although it has been in the upper air passages

4. Incidentally, to reduce the cost of analgesia.

From some accounts published in the various journals concerning the cost of analgesia, it is evident that there is an enormous waste of gas and money in some of the technic employed. They seem to think that it costs $2.00 or $3.00 an hour to maintain analgesia. It should cost by the method I describe, and will show you in the clinic, from 15 to 60 cents an hour at the present prices of gas and oxygen. This means that no good gas is wasted, and it means also that the re-breathing method is employed.

How much should we re-breathe? In rough figures, one-half of each exhalation should be stored up for re-inhalation along with the fresh gases at the next breath. The *first* portion of each exhalation should be the part selected for re-breathing, because it contains 140 c. c. of gases that did not reach below the bronchi and, therefore, took no part in gaseous interchange, and is as good as it was when it came from the tanks. The *latter* portion of exhalation is rich in CO_2 since it came from the deep or alveolar portion of the lungs, and most of this portion should be eliminated at each exhalation and not re-breathed. This selection is done automatically after adjusting the re-breathing bag to the desired capacity.

The volume of tidal respiration may be measured accurately by adjusting the re-breathing bag so that an exhalation just fills it. If the capacity is found to be 500 c. c.—a normal tidal respiration—the bag is set for 250 c. c. of re-breathing. But if the tidal respiration is less than 300 c. c. it is too small for an adult to get good absorption in the lungs, and the bag should be left at this point for a minute or two until the patient develops a larger breath and then set for one-half the tidal capacity whether it be 200, 250 or 300 c. c.

The rate of respiration multiplied by the volume gives the consumption of gas per minute, or the ventilation. The normal ventilation is from 7,000 c. c. to 8,000 c. c. per minute in rest. We want the patient to take this much of air, oxygen, and gas in analgesia as well as in anesthesia. But if by rapid or deep respiration, or both, the patient consumes more than this amount he is *over*-ventilating, and the amount of over-ventilation should be balanced by requiring him to re-breathe this excess. In this way excessive elimination of CO_2 from the blood is also prevented and shock is not so liable to develop during operation. So the re-breathing bag is a means of keeping the ventilation within normal limits and incidentally a means of saving gas.

Since analgesia merges into anesthesia let us review the symptoms which indicate the development of anesthesia. They may be enumerated in their usual order of onset as follows:

1. Closing mouth.
2. Closing eyes, or staring as if blind.
3. No response to questions.
4. Automatic, mechanical respiratory rhythm.
5. Snoring, rarely.
6. Relaxed eyelids.
7. Eyes rotating slowly or stationary, pupils sluggish.
8. Purplish pink color of nails and lips.
9. General relaxation.

Finally, particular caution should be exercised in the care of inhalers and breathing tube, that they are not a means of communicating infection from one patient to another. A few minutes' bath of the inhalers and tubing in a 1 to 5.000 or 10,000 cyanide of mercury solution, followed by a rinse in water and used with the inside of the tubing *wet* will prevent this contamination and will insure a dust- and germ-free gas for your patient.

In closing, I would like you to consider the following points:

1. That N_2O analgesia and anesthesia differ from each other in degree only. the one being a continuation of the other, and as such we may obtain any necessary degree of anesthesia to meet a corresponding degree of pain.

2. The sensations incident to analgesia should be utilized in strengthening mental suggestion in those cases not easily controlled.

3. Asphyxia, the only danger in N_2O anesthesia or analgesia, may be eliminated absolutely in the latter by administering at least eighteen to twenty per cent. of oxygen with the gas. A portion of this oxygen must come from pure supply.

4. Air as a source of oxygen supply is insufficient to eliminate asphyxia in all cases; oxygen used alone is expensive; but a combination of air and oxygen makes the ideal diluting mixture for N_2O analgesia.

5. Accurate re-breathing is a means of regulating the ventilation: stimulating it when insufficient for adequate absorption of gases in the lungs, and reducing the fresh gas consumption when the patient would over-ventilate if left alone. Incidentally, it saves gas and reduces the cost.

DISCUSSION.

Dr. N. W. Hiatt: The Northern Indiana Dental Society is certainly very fortunate in getting Dr. McKesson to prepare the paper he has just read. It is a very excellent paper, and on a subject we are all much interested in. I am sorry, however, that I was selected to open the discussion, as my knowledge of, and experience with, nitrous oxid and oxygen is limited. Dr. McKesson speaks of his personal experience while in the analgesic stage. In my limited experience, I have seldom found two patients that have experienced the same sensation when in the analgesic stage. There is no question in my mind, but that suggestion plays a very important part in the administration of nitrous oxid and oxygen.

I have always tried to impress my patients with the fact that there would be no pain, that there was absolutely no danger, and that I was there to take care of them. But with all this preliminary talk or preparation, some patients will complain of a disagreeable smothering sensation, and plead with me to take the inhaler away. This, in cases where I know, absolutely, that the patient is taking the N_2O and O finely and have continued the analgesic stage successfully.

The essayist speaks of having had adenoids removed for himself while in the analgesic stage. I have given the N_2O and O for a nose and throat specialist in several cases, but only when the patient was completely unconscious. I don't believe the essayist means to recommend operations of this kind where the patient is in a semi-conscious condition. It seems to me that there is a danger point at this stage, should there be pain while doing the operation. I am sure there are some patients who would feel pain during operations of this character, as I have had cases where it was impossible to excavate a sensitive tooth while in the analgesic stage, and was compelled to carry my patient to anesthesia before completing the operation.

I talk to my patient in a very low voice all the time I am working, and have found that one of the best arguments to relieve fear in the patients is that it is up to them to breathe the N_2O and O or not to breathe it. That it is not forced on to them, but that they will have to draw it from the bags by their own efforts. There is no question but that you have to educate your patients in the use of analgesia, for when you tell them to inhale N_2O and O, they have all kinds of visions of things that might happen.

Several years ago, when nitrous oxid was first used by the dental profession, my preceptor bought a gasometer. It looked something like a coffee urn that is used in the restaurants, the gas coming up through water from the cylinder. It was only used then for extracting, and the effect it had on some patients was very amusing. There was one family of five or six girls that had teeth extracted with the use of it, and in each instance they would commence to laugh, and it would take several trials before we were able to complete the operation. They claimed they knew what they were doing, but couldn't help it. A great many of the suggestions as outlined by the essayist for the use of N_2O and O in analgesia are so similar to those I have tried to employ, that I have no criticism to offer. On the other hand, as stated in the beginning, I don't feel that my limited experienece would justify me in criticising the statements made that are comparatively new to me.

In closing, I wish to personally thank Dr. McKesson for his paper, as it has certainly given me some new ideas that I will profit by.

Dr. Clem Shidler: I don't know what you have got me here for—it is all your secretary's fault; he asked me to discuss this subject. I told him, as well as I could, what I knew about it, and it didn't take me long to say that. I asked him to get somebody else, but you see my name on the program. I didn't know it until I received the program. That is my reason for being here.

I received Dr. McKesson's paper and I want to compliment him for the scientific manner in which he has handled this subject. I think it would be better if more of the dentists were going into these things a little more thoroughly. By dentists, I mean myself included with some of the rest of you.

My experience in giving nitrous oxygen as an analgesic is so limited that I do not feel capable of discussing that question, very thoroughly, at least. There are a couple of statements, or one statement, at least, in Dr. McKesson's paper that I would like to call his attention to. It is in the fore part of the paper, and not being here during the early part of the discussion I want to ask him about that statement, and that is this: he says the state of analgesia is made possible by the fact that in the development of general anesthesia the first sense to surrender is the sense of pain. If in the present draft of the paper that is present I want to ask whether or not that is entirely true. If the sense of pain is the first one to surrender, at least in its entirety, why, in the extraction of the pulp, must the patient be anesthetized? Further, if that be true, why is it necessary to give an anesthetic for any major operation? I realize the sense of pain is dulled but does not stop entirely during the stage of analgesia. If there were not pain, it would not be necessary at any time to take the patient beyond the stage where the other senses were numbed. The extent of the anesthesia, as a rule, so far as my limited experience, depends upon the extent of the operation. That is one criticism I find with the paper. The rest of it I enjoyed immensely, and I am sure I will benefit by it in the matter of anesthesia.

I do not, at the present time, use N_2O and O for analgesia. Dr. McKesson says all of you who use N_2O and O for analgesia should be sure to use your mental suggestion. Now, in my practice I have been able to use this same mental suggestion, and I use it unconsciously and I use it with the children who come to me by explaining to the child just exactly what is going to be done, that it would hurt or would not hurt as the case may be and always absolutely telling them the truth. To my mind a great deal of the credit that is given to N_2O and O is due to mental suggestion. Now, just yesterday I prepared two cavities for a young lady perhaps sixteen years old who was very fearful of being hurt. Now, I treated her just as I would treat children when they first come to the office. I told her positively that the first revolution of the bur would not hurt. I asked her to relax, and I prepared a fairly good-sized cavity, and she said she had not experienced any pain whatever. I followed that by preparing a lower bicuspid for a gold inlay. I talked to her all the time. The whole cavity was prepared, and properly, I think, and she experienced, as she told me afterward, only a very little pain. I followed this to a certain extent and the suggestions of Dr. Johnson, a man who many of you revere and love. I remember while in college there was some one who sent this question to him—we had the privilege of sending down questions—''What is the best obtundent for sensitive teeth?'' Dr. Johnson contracted his brow as he usually did in answering some question of this kind and he made this reply: ''A sharp instrument in the hands of a skillful operator.'' No longer ago than last fall at the meeting of the Northern Indiana Dental Society our good friend Mr. Harter told us that one of the men who had one of the largest practices in his state, I believe, made that remark. At least he was busy all the time, was a man who used sharp instruments, and was careful with his patients. He didn't use, as I remember the statement, N_2O and O. He referred to his business as being big because his patients were not hurt very much.

A number of years ago, perhaps five or six, a young lady came to my office, and this case bears out my contention that much of the pain can be eliminated by mental suggestion. This young lady came in the office and wanted some fillings put in some teeth that were causing her pain. She had been hurt more or less by a dentist, who, several years before, had done work for her. She was very nervous and anemic, but I saw, in looking over her teeth, there was a great deal of work to be done—a few crowns to be made, many cavities to be prepared and many fillings to be put in. I saw it would have to be done at once or she would lose her teeth. I just took half an hour and sat down and talked to her, and explained to her that she could have all those teeth taken care of without an excessive amount of pain. She would have *some* pain, of course, but not an excessive amount. To make a long story short I filled every one of those teeth without any general anesthetic. She was no different from any other patient. Of course, at each operation I told her just what I was going to do and the probability as to whether there would be any pain or not. The young lady is still a patient of mine. The fillings, most of them are in position; she has never had an extraction since that time, and she has been given a good service. Now, if this patient were to come into my office today that service would be credited to N_2O and O, I feel quite sure.

As I said in the beginning I want to compliment Dr. McKesson on his paper because it brings out the scientific phase of the subject that has been very interesting to me. I thank you.

Dr. U. B. Shonts: If I may, I would like to ask what percentage of patients, as the years come and go, in cavity preparation can be taken care of in that way?

Dr. McKesson: In regard to Dr. Shonts' question I don't know whether I can answer it or not. We will have to wait and see. It is too early and we haven't the figures. I think I will call on Dr. Gillis to answer that question if he can.

Dr. Gillis: It is a hard question to answer because you may still ask of so many cavities what percentage do you fill with gold, what percentage do you fill with amalgam? The use of nitrous oxid and oxygen as an analgesic is something that must be determined by yourself as the patients come. I would not tell you every patient needs nitrous oxid and oxygen. I believe I have very few patients for whom I do not employ it. If a patient makes half a dozen visits to the office for work I may use it but once or twice, but at those visits I will prepare enough cavities to keep me busy during the other appointments. There are many patients for whom you cannot prepare a cavity without it, after you have once used it.

I am not in accord with what Dr. Shidler said. I think there is more than fifty per cent. of us that need nitrous oxid to make up the deficiency Dr. Shidler has. I am mighty glad I have nitrous oxid. However, I don't want you to gain the impression that you will have 100 per cent. success. I know when Dr. Shidler got his machine, and I am sure he did not use it long enough to make a fair test. Nitrous oxid and oxygen is all right, and I firmly believe it is here to stay unless there is something that comes along to take the place of it. There is no use of talking of being able, with the ordinary run of patients, to talk to them and by mental suggestion fill up the gap that would be vacant if you didn't have nitrous oxid to fill in. We have many patients who are nervous; it can be used for that, you don't have to use it entirely, because a few whiffs of it will give them a sort of indifferent feeling and you can go ahead then and do many things. I believe seventy-five per cent. of the patients, after you get through, will speak of it as being pleasant. I will say three out of five, I am safe in that number. Don't expect to get the machine home and have 100 per cent. success. I am safe in saying Dr. McKesson or any one of us who have had experience will not claim 100 per cent. success. I will say perhaps one time in ten you may fail in accomplishing what you wish. Of all the patients for whom I have worked, I know of only a few who are not willing to take it the second time. Just recently I had one young lady for whom I was preparing some cavities. She was in the hands of another dentist and he had filled a lot of them and a lot of them were left undone. The first time I gave her nitrous oxid and oxygen she was nervous. I had more than I could do to calm her fears. Her high-strung nervous condition plus nitrous oxid and oxygen resulted in a headache. The next time she came back she did not hesitate nearly as much as she did before. I said, ''we will go ahead without it if you want to,'' and she said she wanted it. The third and fourth time she took it.

The first time you try it on a new patient it is a pretty good proposition to give them a sample first before you do any work—let them find out what they are going to feel like, and then prepare some simple cavities first until they get acquainted with the feeling. Some say it feels like wooden teeth, then you can go to work with more difficult cases.

But, in answer to Dr. Shonts' question—it is mighty hard to answer it with any precision at all. In past years before we had analgesia we went ahead and prepared cavities whether or no. We can't continue to do that and torture our patients when, by the use of nitrous oxid and oxygen you can eliminate ninety per cent. of the torture. Don't tell your patients you are going to prepare cavities without them feeling it. There is a great deal of difference between pain and feeling a thing. I can touch Dr. Henshaw's head and he will feel it; I can pull his hair and it will hurt; I can put him under analgesia and it will not hurt, but he can feel it.

I am mighty glad I have been able to listen to the discussion without somebody harping on the terrible past history of nitrous oxid. I was sitting here as I did down at the state meeting with a brick under my seat, and I was going to throw it at the first man that mentioned it. It is well for us to profit by the past experiences of nitrous oxid, but we don't need to bring it into our discussions now.

It seems to me that children are more easily handled than others—they haven't grown so far away from childhood's imaginative state. As we grow up we grow a little farther away from that. If we start in with children from nine to fourteen years old, you will find they are very susceptible patients. You can approach a boy or girl by talking to them about their childish play; talk to them about sliding down hill or going in swimming or something else and get their confidence by telling them a few facts. Describe the symptoms, as Dr. McKesson suggested. Tell them to expect a tingling of the fingers, a full feeling in the head and possibly in the ears, a thumping in the ears and the lips will feel thick and warmth will come over the face or possibly the entire body. The voice, if they speak to you, will sound thick and far away. Often, these symptoms will not appear in every case; in some patients they will. Ask them to snap their teeth together, and if they are normal they can snap their teeth, when in analgesia you can tell from the sound. It will sound like rubber between the teeth. Ask them if they feel like rows of wooden teeth in their mouth, and if they say they do then you are ready to operate. Go slowly, and with a little mastered technic you will get there with the rest of us.

Dr. W. L. Myer: I just want to say a word in defense of having Dr. Shidler on the discussion of this paper. Dr. Shidler and I meet every year at the Northern Indiana, and once in a while at the State meeting, and we have talked over analgesia, and I thought the doctor would be a good man to put on this paper because I knew he had an apparatus over in his office which I knew he didn't use for anything except anesthesia. I have one in my office I use for analgesia. I thought Dr. Shidler would be the one you would want to hear discuss this paper. I told him he was on, and he knew it all the time. I don't use my machine as much as Dr. Gillis does, and I probably cannot use mental suggestion as well as Dr. Shidler. If I had those two accomplishments I would locate in Gary.

I am going to give you two of my cases, the worst and best patient. The best one was a hard patient to work for—one of those you don't like very well to see coming in the office. About a year ago I got the apparatus and during the last three or four weeks she came in the office to make an appointment. She saw this apparatus there. She didn't know I had it, and asked me what it was. I told her, and she said she had read an article in *The Saturday Evening Post* about it and was glad I had one. When she came for her first appointment I gave her analgesia. She is the best patient I ever worked for in the first operation. She knew what was coming to her. You didn't have to use mental suggestion. I prepared five or six cavities and she said, "that is certainly a godsend to humanity." The other patient was a girl I have always had trouble working for. I thought this would be great for her. I gave her analgesia and I absolutely could not work for her in the analgesic state. She would get hold of my hands, and I could not work at all. The only possible way I could work with her was in the state of anesthesia. She would come up there and want it, but at the same time she would not give up. I could not work mental suggestion on her to have her relax enough for me to do that work. Simple cavities that I knew could be prepared without hurting her I could not do at all. When a patient comes in the office with her mind made up it is not going to hurt, you can put your face piece on her and work on her, and the other patient you absolutely could not work on unless you had her in the state of anesthesia. I would not take a good deal for my gas apparatus. I thank you.

Dr. Shonts: I have seen this case that Dr. Meyer talks about, and I believe even the suavity of Dr. Shidler would not keep her quiet. I call to mind a similar case, only my patient happened to be a woman larger than I, that could get her arm around and take hold of the operator. What percentage of these cases in which you need it will you not get the results?

Dr. Le Galley: That is a pretty hard thing to answer. When I get hold of a case of this kind, I just carry him under complete anesthesia and do the work under complete anesthesia.

Dr. Shonts: I have seen nitrous oxid used for a period of about eighteen years and find that sometimes it doesn't work under complete anesthesia.

Dr. McKesson: In regard to the very last statement that it doesn't work in anesthesia, it is up to the technic. There is not any patient that cannot be anesthetized with nitrous oxid and oxygen if you go into the technic properly.

Dr. Shonts: And get absolute muscular relaxation?

Dr. McKesson: Yes.

Dr. Shaffer: What have you reference to in your paper about that twenty per cent. in connection with the administration of ether or chloroform? Formerly they gave nitrous oxid with chloroform, they were mixed; you can get complete anesthesia under that.

Dr. McKesson (closing): You can get it without that. If you have a case that is a bad one anesthetize the patient. If you know he is going to be a hard one to get under, being a big muscular fellow or an alcoholic type, before you commence give him a tablet of morphine an hour before and let him wait—he will come in and take it like a baby. It is a matter of knowing what to do, and how to do it. We are not limiting ourselves to nitrous oxid. If we are going to dig a hole in the street, we don't use a pick all the way down, we use the tools and means that serve our end. So, if morphine is indicated in a particular patient, give it to him.

Another thing, in surgical operations, the site of the incision where the hands go in and out, is a cause of irritation. The nerves running to the central nervous system are being stimulated every time the surgeon's hand goes in and out. What is the latest thing, what is the thing we are doing to prevent it? We are using a local anesthetic to block these impulses. Even if the patient be asleep, the impulses reach the central nervous system; even if we have no external muscular manifestation that these impulses are reaching the central nervous system, we know they do because the patient suffers shock after a certain length of time. That is under the study of *technic*. Use everything that will help you, a local, suggestion, morphine or anything that will help you.

In regard to the sense of pain, the elimination of the sense of pain. I don't think I made that statement. The first special sense to surrender is the sense of pain, leaving the other special senses *less* influenced. Now, they *are* influenced. For instance, deep analgesia is the very next thing to the anesthesia stage. If you were looking at a door, as I was in my second experience, the panels would be blurred, the vision disturbed. You don't know just exactly whether you are sitting or standing. That is where you are getting right close to anesthesia. So, the other senses *are* disturbed before you get a complete loss of pain. Complete loss of pain comes in anesthesia only, but the fortunate thing is that the *superficial* pain is obtunded before we lose our mental consciousness. I think that is about all, unless somebody has another question. I thank you.

TUMORS OF THE MOUTH*

BY CARL D. LUCAS, D.D.S., INDIANAPOLIS, IND.

IT IS NO DOUBT PRESUMPTUOUS for a member of the dental profession to endeavor to present the subject before us tonight, but the presumption is assumed with the purpose in view of stirring up discussion which, it is hoped, will stimulate us to more careful treatment of our cases of oral sepsis.

Tumors of the mouth are not relatively numerous; however, when present, should be seriously considered. When not present, but when exciting or predisposing causes are present, it is the duty of the dentist to his patient to eradicate what may be the exciting cause and thereby practice another phase of preventive dentistry.

Before advancing to the subject proper it might be well to review briefly our pathology of tumors in general. Clinically, any localized swelling may be considered a tumor. Pathologically, a tumor is a swelling due to morbid or abnormal growth of tissue which consists of certain cellular proliferations.

The cause of these new growths is not definitely known. One theory is that they are parasitic in origin, but this theory is disputed. From facts gleaned from clinical histories and careful observations, tumors are the results of over-stimulation of tissue to proliferation by reproductive, almost destructive, inflammation.

Tumors are divided into two great groups: *Benign and Malignant.* The tumors of each of these groups are classified according to the kind of tissue found predominating, from which they arise, either epithelium or connective tissue. Malignant epithelial tumor is called carcinoma or cancer and a malignant connective tissue tumor is called sarcoma.

A benign epithelial tumor is called an epithelial wart or papilloma. Benign connective tissue tumors are named according to the variety of connective tissue of which they are composed. A benign tumor is a swelling due to morbid or abnormal growth of tissue which is not likely to recur after removal. It does not involve danger to life. A malignant tumor is an abnormal growth which is recurrent and becomes progressively virulent. If not operated in its early stages it proves fatal.

The following classification of benign connective tumors is made: Lipoma, fatty tumor; Fibroma, true connective tissue type; Osteoma, bone; Chondroma, cartilaginous; Myoma, muscular tissue; Neurofibroma, nerve substance incorporated in fibrous matryx; Keloid, fibrous growth in true skin; Angioma, composed of blood or lymph vessels with fibrous matryx; Myxoma, mucous tissue, lowest grade of adult connective tissue.

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*Read before the Indianapolis Dental Society, March, 1913, and before the Jefferson County Dental Society, Louisville, Ky., June, 1913.

The varieties of carcinoma are: Epithelioma, of the squamous, cylindric celled or tubulated variety. The tubulated epithelioma or rodent ulcer is the one most frequently found upon the face and lips.

Glandular carcinoma may be subdivided into Scirrhus, hard, chronic, fibrous cancer; Atrophic scirrhus, self-limiting Enchephaloid, medullary, soft, or acute cancer of brain-like consistency; Colloid or gelatiniform, degenerative changes occurring in the proteplasm of the epithelial cells, Mucoid, degeneration of intercellular substance, and Melantotic carcinoma.

Sarcoma are composed of atypical connective tissue in which the cells predominate over the intercellular substance. The atypical cells infiltrate the surrounding tissue, therefore sarcoma is rarely, if ever, encapsulated. The varieties of sarcoma are the round-celled (rare), spindle-celled (the most common sarcoma), giant-celled, alveolar and melanotic.

The diagnosis of a tumor as to its malignancy should be based upon its gross, pathological and microscopical appearance. Clinical diagnosis is based upon the history of symptoms produced by the tumor, given by the patient and what you can make out by examination of the growth by palpation and history of the growth, given by the patient. In most cases tumors of the mouth are covered by mucous membrane. In some cases the new growth has ruptured the mucous membrane and thus is exposed an ulcerating surface. Tuberculus ulcers and chancers on the tongue have the appearance of a suppurating carcinoma. Microscopical examination of scrapings and general physical examination will establish a differential diagnosis of these lesions. If these lesions are multiple, which is frequently the case, they are not primarily cancerous.

The most important factors in the history from the patient are age of patient and duration of the disease. In general, malignant epithelial tumors are rarely observed to begin before thirty.

Malignant carcinoma and sarcoma, if not operated early, usually kill the patient by internal metastasis within from one to five years. Longer presence of a tumor suggests either a benign tumor or one of a relatively low grade of malignancy. The very malignant bone tumors, such as those arising in old fistulae from chronic alveolar abscesses and chronic empyema of the maxillary sinuses usually kill within two years by metastasis. Metastasis means the spreading of disease from one organ, or focus, to other organs, or tissues. Carcinoma metastasize through lymph channels and sarcoma through the blood direct, by implantation of cancer cells.

If the patient examined presents with a swelling upon the surface of the lower maxilla, and has observed the swelling more than two years, this factor of time alone practically excludes the more malignant sarcoma, the giant-celled sarcoma, or osteo-sarcoma. A strictly benign tumor, like a bone cyst or an enchondroma would be the differential diagnosis. The first symptom of a tumor of the maxillary sinus is pain, caused by a pressure of the new growth upon branches of the fifth cranial nerve. Reflex pains to the upper teeth are among the first symptoms. Hemorrhage from the nose is a frequent symptom of tumors of the nasal cavity. Unilateral or bilateral obstructions to nasal respiration (mouth breathing) should at once suggest an investigation of the nares and pharynx. In young children nasal polypi or pharyngeal adenoids will be found. In older patients usually a malignant tumor is the cause. Pain in the upper or lower teeth is frequently present before a tumor in the upper or lower jaw manifests itself by swelling.

Later symptoms of tumors may be divided into local and general. Local symptoms are due to growth of tumor and infiltration of tissues surrounding the tumor. General symptoms are produced by dissemination of tumor cells through the lymphatics and blood vessels--internal metastasis.

The general symptoms produced by metastasis are called cachexia. This is a depraved state of nutrition. The patient in this condition is anemic, loses weight and strength, loses appetite and usually has a sallow discoloration of the skin. If these conditions are due to tumor metastasis there is no hope for the patient and one should never wait for them to appear to make a diagnosis of malignant tumor. However, in large ulcerating tumors, the absorption of toxins may produce a clinical picture of cachexia, or the patient may die from a general infection in which the ulcerating tumor is the portal of entrance and still the tumor may be local and operable and there may be no metastasis. Therefore, local symptoms are of more importance than general.

After considering age of patient, duration of tumor and symptoms of onset, we should inquire into the original size, whether growth was observed at onset and remained stationary since, or whether gradual from onset. Has it varied in size, or has it disappeared to reappear again? This latter phenomenon may occur, due probably to resorption of its fluid contents and re-accumulation. This would indicate a benign cyst. Question as to whether the tumor has ever pulsated. The most common pulsating tumor is an Aneurism or a sac filled with blood formed by the dilatation of part of an artery.

Benign tumors usually grow slowly, reach a certain size and remain stationary. Malignant tumors usually grow rapidly and the rapidity of growth increases.

We should know the form and consistency of the tumor primarily and what changes have occurred. Was it at first adherent to the bone or mucous membrane? If freely movable at first, how long has it been fixed?

Benign tumors are circumscribed, freely movable and although they may increase in size they retain these physical characteristics. Malignant tumors may at first be circumscribed and freely movable, but they eventually lose these characteristics, become fixed and infiltrate surrounding tissues. This infiltration and the formation of an irregular fixed mass is more characteristic of carcinoma than sarcoma.

Benign submucous tumors, whether of epithelial or connective tissue origin, in their growth, produce no cellular infiltration beyond the original capsule. The increase in size is due to proliferation of cells within the capsule, while malignant submucous tumors grow by infiltrating surrounding tissue.

Very little seems to be known about the etiology of tumors but our examination should record the relation of tumors to an hereditary family history, trauma, congenital tumor, benign tumor which has suddenly manifested growth, and to inflammation. It is generally conceded by authorities that heredity is an etiological factor. In sarcoma of bone it is the rule to get a history of preceding trauma. Many authorities record a direct relation between constant pipe smoking and cancer of the lips. Not infrequently cancer of the tongue may result from a long-continued irritation from a jagged tooth. Therefore, it would seem that continued irritation producing chronic inflammation is a very suspicious factor in the formation of neoplasms.

Sarcoma and carcinoma are quite frequent late manifestations in wounds which do not heal, chronic abscesses, fistulae, etc. This brings before us the importance of doing everything possible to insure prompt healing of wounds, abscesses and fistulae of the mouth, removing all causes of irritation, such as jagged, diseased roots, and to be suspicious of all ulcer formations within the mouth which do not heal.

From the foregoing general data it is evident that the dentist who advises his patient against treatment of chronic abscesses with fistulae so long as there is no physical inconvenience, or pain, is doing the patient a gross injustice. How many of us have had patients tell us of this advice from old practitioners of dentistry? Such advice was the rule in times not far distantly past, not the exception, and we should be aroused to the dangers of such injustice. Many cases of osteosarcoma are on record, which apparently were the resultants of mild, chronic infection and chronic inflammation at the ends of roots of devitalized teeth. If treatment of these teeth does not prove successful the affected teeth should be extracted and non-irritating artificial substitutes inserted. This stands to reason purely from the standpoint of the subject before us tonight, aside from all systemic manifestations of oral sepsis which the offending members might produce.

Chronic abscesses at the apices of bicuspids and molars which discharge into the maxillary sinuses have been credited as etiological factors in carcinoma of the antrum. One such case has come under the observation of the writer. One case of osteo-sarcoma has personally been observed which was probably due to the chronic inflammation in an old discharging abscess at the apex of the root of an upper lateral incisor. This tumor was diagnosed and operated early, therefore prognosis is good. One Adenoma, probably the result of a mild infection from a putrescent pulp in upper left second bicuspid, was operated in September, 1910. The tumor was on the buccal side of the process. This tumor was encapsulated and since operation no recurrence has been reported.

One case of lipoma in the left side of soft palate was operated in 1906. Possibly this tumor would never have become malignant, but the possibility of irritation from the act of deglutition might have caused a malignant change in time, had the neoplasm been allowed to remain *simply because it was causing no pain or inconvenience.* Three papillomae in the floor of the mouth have been operated by the writer within the last year. They were situated immediately beneath the mucous membrane, were freely movable, encapsulated and no recurrence has been noted to date.

Epithelioma of the lips and tongue have never come under the observation of the writer. These tumors metastasize primarily to the submental or submaxillary lymphatics.

Ludwig's Angina could be classed as a tumor, clinically. It is an acute spreading inflammation in the soft tissue, starting in the floor of the mouth, or submaxillary region, which binds the structures in a hard indurated mass. If the infection, although it be very mild, progresses over forty-eight hours, pus will be present and stab incisions for drainage should be performed. Two such cases have come under the observation of the writer. Ranulae are chronic, benign cysts of the floor of the mouth, due to occlusion of a duct from the sublingual gland. They are usually unilateral. One case of Ranulae was treated by dilating the duct of Reveni with silver sounds and keeping the duct open by sounding daily for two weeks. In this way normal lumen of the duct was re-established.

Fibroma and papilloma of the tongue have not been under personal observation. Papilloma of tongue may occur at any age.

Sarcoma of the tongue is rare. Its growth is slow at first. It may remain stationary for years then suddenly terminate in extreme malignancy.

The better results of operative treatment of tumors in the early stage soon reach public attention and for this reason, delay, due to procrastination of the patient, will decrease in pretty direct proportion to the rapidity with which we improve our short-comings. Then the responsibility rests with the profession. It is the surgeon's responsibility to reduce mortality by improvement in operative technic; it is the general practitioner's responsibility to train himself to recognize these surgical lesions in their earlier stages, in which, with improved technic, the chances for the patient's immediate and ultimate relief are the best.

DELETERIOUS EFFECT OF MERCURY IN RUBBER PLATES

BY S. T. KIRK, D.D.S., KOKOMO, IND.

I WANT TO EXPLAIN the harmfulness or deleterious effect of the mercury that we have in rubber plates, not only upon the roof of the mouth from the plate coming in contact with it, but upon the whole system. I have noticed this for a great many years. I have noticed, and so have you, how red a mouth will get sometimes when wearing a plate. By looking at the mouth I can tell what kind of a plate a person is wearing, from the condition there. We have a redness which comes from the heat of the rubber, but it is not all that by any means. We also see what is termed by the homeopathic as the dynamic effect upon the system. I have changed plates for no other reason than because they contained mercury. In several instances I have had patients come back to me in three months and say, "What did you give me that medicine for?" One woman says, "I got well from the trouble that had existed a long time." This is a typical case. There may be some vaginal, uterine or other trouble. Many patients do not have a bit of that trouble remaining inside of six weeks after they take the medicine which I give them to combat the mercury in their system.

After putting a plate that has no mercury in it in the mouth and counteracting the mercury in the system they have no further trouble.

A woman came to me who had a good set of teeth and they were all right except for the red rubber. I told her to wait three weeks for her mouth to get well before I would put in new teeth. At the end of three weeks she said she was so much better she would wait another three weeks.

Another lady came in to have lower teeth put in. She said, "I cannot go without my teeth at all, and I want my impression taken right away." "No," I said, "I am not going to take an impression for about two weeks, and I want you in the meantime to leave your upper plate with me." "But I cannot go without it," she said. I persuaded her to go home, and in two weeks I put her upon my books for a full set of teeth.

One more case: I just met a lady and her husband on the street, and she voluntarily told me the condition her mouth was in twenty years ago, red and sore. I had told her she must have her plate changed. I tried to explain the harmfulness of the red rubber she was wearing. When I told her she refused to leave her teeth with me for three weeks until her mouth was well. But her husband believed me and almost forced her to do so. I afterwards placed in her mouth a set without mercury.

And she said today she had better health and a healthy mouth ever since. And both thanked me cordially for what I had done for her.

All vulcanite containing mercury causes neuralgias especially about the face and teeth, also copious discharges of uric acid crystals. Where these conditions are caused or aggravated by the mercurial plates the patients are entirely free from them within six weeks after taking the medicine to antidote its effects, and changing the plates to non-mercurial rubber. A phlegmatic temperament will not be affected as much as a bilious or nervous.

As I have already stated, have had patients come to me in a few months and ask me what I gave that medicine for. I gave it to counteract the mercury. They say, "Do you know what was the matter with me?" I say, "No, I am not a physician and do not know. Only I know you were poisoned by mercury in your rubber plate and I removed it and put in a plate which has no mercury, antidoting the mercury already in your system."

The remedy above mentioned is homeopathic and is prepared by Boericke & Taffel, Philadelphia, Pa., or Chicago, Ill., and known as Red Vulcanite. I give only about four doses--two a day at first, but sometimes repeat it in two or three weeks.

I am a believer, however, in the old axiom that if the cause is removed the effect will cease. But I am sure that the results by using the antidote will be attained much sooner.

The test for mercury in rubber: Burn a small piece of rubber; catch the smoke on a piece of glass: with a small piece of cotton in pliers, dipped in nitrous acid, wipe off the smoke and rub on a piece of copper; if there is mercury it will show plainly.

The following rubbers I have tested and found clear of mercury: Doherty jet black rubber; No. 8 dental rubber, Consolidated Dental Manufacturing Company; Traun's No. 21 "Gold Dust" dental rubber. The only pink rubber I have found is the N. V., C. Ash & Sons.

THE ETIOLOGY OF TRIFACIAL NEURALGIA OR TIC DOULOUREUX AND CLINICAL TREATMENT*

BY NELSON T. SHIELDS, D.D.S., NEW YORK, N. Y.

THE FUNDAMENTAL CAUSE of trifacial neuralgia lies in some structural change. The really painful tic usually occurs about the period of middle life or later and is generally caused by a lesion or lesions within the teeth. All strain, whether mental or physical (and this comprises that common to all diseases and conditions), which a normal amount of sleep cannot relieve or during which the tissue consumed cannot be restored, these abnormal conditions are the foundations for an earlier degeneration of the nerve structure. No injury to the teeth from external causes, and no injury to the dental pulp from constitutional causes ever repairs itself. That is, should a tooth be broken or decayed it can never be restored by natural means, or should a pulp nodule or dentinal

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*Read in the Section on Stomatology (A. M. A.) of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with *The Journal American Medical Association.*

tumor form within the pulp from constitutional causes it will never be absorbed. A normal life should be led more on account of the teeth than any other organs of our bodies, because within the teeth branches from the maxillary nerve and from the mandibular nerve terminate within an organ, the function of which is to make tooth structure from without inward, after the manner in which teeth are formed.

The odontoblasts within the dental pulp (the pulp being the remainder of the formative organ which made the tooth) receive the irritation from any local injury and cause tooth structure to form within the pulp at the base of the fibrillae conducting the irritation. This is most dangerous at the cervix where the blood has to circulate around the secondary dentine to the pulp chamber beyond. The odontoblasts likewise cause calcifications to form within the pulp from any constitutional cause which affects the vasoconstrictor nerves, a consequent increased flow of blood through the arteries results, followed by their dilatation and the immigration of the leukocytes. Thus the arteries occupy more than their normal space in the canal, while the leukocytes fill the meshes of the connective tissue and produce compression on the vessels of exit. This irritation or hyperemia will cause pulp nodules or tumors to form throughout the entire pulp causing lesions and violent tic douloureux before strangulation occurs.

Frequently, in severe cases, the teeth, the alveolar process and gums are in perfect condition save the abrasion on the articulating surfaces which is normal after the period of middle life. We must, therefore, in these cases. look for internal causes for irritation which are to be found in the presence of dentinal tumors or pulp nodules. These patients are about sixty years old and have a poor circulation. The family physician having exhausted all means of relief, the patient is about to be operated on either by having alcohol injected or by avulsion of the sensory root. General nervous irritability or neurasthenia is a term which has come into general use to indicate certain states of the nervous system which are characterized on the one hand by a series of negative symptoms manifested by lack of vigor, efficiency, and endurance, affecting usually a large number of nerve functions, and on the other hand, by signs of active derangement, which in part seem to occur as positive symptoms and in part are due to a failure of the mutual support and control which the different parts of our nervous system afford each other in health. The tension of the blood-vessels and their degree of contractivity are phenomena which are controlled by the vasomotor system.

We can generally find lesions within the pulps of teeth, where impacted teeth become infected, diseases of the teeth, alveolar process and gums, and maxillary and frontal sinus complications which are generally caused from the affected teeth.

The knowledge is valuable that any constitutional condition affecting the vasomotor system will cause irreparable injury within the dental pulp, and that the formation of tumors or calcifications in the structural change, or lesions which will result in trifacial neuralgia or tic douloureux.

TREATMENT

In simple cases a careful study will clearly indicate the teeth or tooth, which is the cause of the neuralgia. The pulps of the teeth involved should be extirpated by pressure using cocain anesthesia. After thorough extirpation by mechanical means, using suitable broaches, asepsis being maintained throughout, the apical portion of the root-canal should be filled with gold and the remaining portion should be filled with zinc oxychlorid. The zinc oxychlorid not only fills the remaining portion of the root-canal, but from its affinity for moisture, practically fills the dentinal tubules. This constitutes in my estimation a perfect root filling.

This case will remain free from neuralgia until a lesion is formed within another tooth, when the same method of procedure should be employed. In severe cases of tic douloureux radical measures should be employed, and every pulp should be extirpated, the teeth filled as described and the mouth should be restored to normal health and usefulness. This will permanently cure.

Children suffering from migraine type as described by Dana will generally be found to possess impacted teeth which should either be regulated to their normal positions or extracted.

By means of roentgenography infected impacted teeth can be revealed and then extracted. In most cases tic douloureux occurs after the patient has reached the age of forty-five, and has a poor circulation. I strongly urge the use of agents to induce a normal secretion of bile, which will favor restoration to health.

Maxillary sinus complications are generally caused from the teeth. Occasionally the frontal sinus is connected with the maxillary sinus, as has been demonstrated by Dr. Cryer in a number of human skulls. The tooth or teeth causing the sinus involvement should be extracted and the sinus treated and cured through the tooth socket. Both sinus involvements on the same side can be cured from the socket of the tooth extracted. A sinus involvement should always be cured through a tooth socket.

This treatment in my hands has been a permanent cure for trifacial neuralgia or tic douloureux.

61 West Fifty-sixth Street.

Why! Tomorrow may die in its womb, and Yesterday sleeps soundly in the grave. Today alone lives, so grasp it while it yet has life, and hold it to the last moment.

LOCAL ANESTHESIA*

BY DR. N. T. YAGER, EXODONTIST, LOUISVILLE, KY.

FROM TIME IMMEMORIAL the problem of the prevention of pain has engaged earnest attention in the practice of the healing art, and no other branch of medical science was better suited, and more capable of striving after its abolition than surgery.

Fostered by the special branch, dentistry has now matured into a fully privileged and independent department, after having received numerous tokens of maternal care from the "Mother Science," not the least of which being the great inspiration in the endeavor to attain local anesthesia.

We all know what has been accomplished in the way of general anesthesia, and especially are proud of the fact that we are indebted to the dentist for what we have. The operations in the oral cavity, so extremely painful compared with other operative intervention, prompted a special care to diminish or abolish entirely the sensibility of the teeth, a desire which was all the more justified as the general enervation accruing from modern civilization was daily increasing.

Moreover the destruction of the teeth by caries is assuming most alarming proportions, and all possible means of inhibiting this universal disease should be studied.

Pain is a harsh, but useful law of nature, but like all natural laws it is unyielding in its consistency, blind in its disregard, brutal and cruel. Like all other sensations, that of pain is one of the functions of the cerebral cortex in the "sphere of physical sensations," in which the sensory filaments are supposed to terminate. Consequently the sensibility to pain is widely distributed in the human body, and that fact sufficiently accounts for the continuous efforts of practical medicine from its beginning to influence this property of each tissue, by an artificial reduction of sensibility before operative intervention. By these efforts it is intended to produce inhibition of sensation, or anesthesia, or at least inhibition of painful sensation, or analgesia. These conditions are produced by narcotics, such as nitrous oxid, ether and chloroform, and drugs such as cocain, nervo-cocain, or by hypnosis or by pressure.

It is not my intention to consider general anesthetics in this paper, for the reason that but *few* would be interested while *all* are interested in the use of local anesthetics.

There are two methods by which local anesthesia may be produced. Local anemia, and the action of certain drugs that directly obtund the conducting power of the sensory nerves.

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*Read before the Jefferson County Dental Society, Louisville, Ky., Sept., 1913.

Local anemia can be produced by pressure, or by reducing the temperature by application of ice or by ethyl chlorid, which is the best agent for producing refrigeration of the tissues. Protect the mucous membrane by a coating of vaseline or use of cotton rolls, or napkins, and also protect the throat. Holding the spray about eight inches from the area to be anesthetized, a fine stream is directed on this area and continued until it is covered with ice crystals and the tissues have turned white. In using this method in extraction, the crown of the tooth or teeth should be protected, and the spray directed on a point as near the apex of the root as possible.

This method of producing anesthesia is necessarily limited to areas easy of access. Local anesthesia produced by the use of drugs brings us to our friend, "the hypodermic syringe." In order to successfully inject a local anesthetic one must have a properly constructed syringe. The amount of pressure necessary to inject the anesthetic into the dense gum tissues ranging from ten to fifteen pounds. and in some cases more, necessitates the syringe being strong, and convenient to handle. Joints should be perfect, preventing leakage, and so constructed that it may be thoroughly sterilized.

I am referring to the syringe used for local, not pressure, anesthesia. As to the point of needles, I prefer the thin keen-pointed needles, used by the M. D.'s, to the ones usually furnished for dental purposes except in cases when a heavy or strong needle is indicated. The next and most important consideration after diagnosis has been made is the technic of injection. As in all other dental operations, if we do not pay close attention to, and carry out fully, the proper technic, we canot expect to get the best results.

The anesthetic may be forced into the tissues in or about the teeth in the following ways: Sub-periosteal injection, inter-osseous injection, perineural injection, and injections into the pulp. For operation on the soft tissues the injection is made directly into the tissues to be cut or around the sensory nerve supplying the area. Before beginning the injection the field of operation should be cleaned, then paint the surface with tincture of iodin. This done, the syringe properly prepared and filled, you are ready for the injection. The method used depends entirely on the indications of the case. Just a word at this point in regard to the initial puncture. Up to this point suggestive therapeutics play a very important part, and as in all dental operations, a great deal of the success depends on gaining the confidence of the patient, but after you have gotten along this far a great deal depends in many cases on the painless injection of the anesthetic. A mildly warm solution and a warm sharp needle with a drop of the anesthetic on cotton held over the point of puncture for a moment will ofttimes render the insertion of the needle painless.

On the nature of the case depends the number of applications of the needle, and amount of anesthetic. Haste and unnecessary pressure will cause pain. The next important point is after the injection. Don't be in too great a hurry to begin operating. Give the anesthetic a chance. The time to wait depends entirely on the agent used, but be the time long or short, it may be very profitably employed by some interesting conversation, outside of dentistry, which you will find has a very beneficial effect on the patient.

After operations, *especially* in extractions, massaging the gums is very beneficial in forcing out an excess of anesthetic. As to indications relative to the patient, I may say those persons who may be described as *nervous*, are ofttimes very poor subjects and it is difficult to state when a patient may collapse under a local anesthetic. It remains mostly a matter of using common sense (Dr. Blair says) whether a patient shall receive a local anesthetic or not. If, however, there is an indication of a general derangement of the nervous system, the use of cocain, or any of its alkaloids is contraindicated.

Injection in pus-pockets must always be avoided, the application being made in sound tissues of the surrounding area. One of the safeguards in the use of a local anesthetic is the incorporation of adrenalin which tends to localize the action of the drug. I am of the opinion, aside from the idiosyncrasy of the patient, the majority of the bad results are from a non-sterile solution or instruments, and faulty technic.

BENEFITS DERIVED FROM BELONGING TO THE DENTAL SOCIETY*

BY W. J. WHITEMAN, D.D.S., DETROIT, MICH.

I HAVE BEEN ASKED to tell you in a few minutes the benefits I have derived from belonging to the dental society, and why the young man should join as soon as possible after graduation.

The time allotted to me is so short that I will have to be very brief in telling of the many benefits I have derived from this society.

I became a member three years ago, shortly after graduation, and for practical help have gained more from this society in that time than I did in my three years of college life.

What I mean is this: my college training was the foundation, what I gain from this society is a continual post-graduate course from men of long experience.

I have become acquainted with men whom it is a pleasure to know; men who are known throughout the country for their fine work; men who have high ideals and who inspire the young man to do the very best work possible. These men I would not have met if I had not joined this society, and they have always been willing to give me advice and encouragement whenever I needed it.

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*Read before the Michigan First District Dental Society.

If I had the time I would enumerate the many ideas I have received from different members, but, as the time is limited, I will sum it up by saying that I have received many pointers on every phase of dentistry. My methods of doing a great deal of my work have been changed entirely, due to my membership in this society.

The experience I have gained in the last three years is beyond price, and I know that in the years to come I will gain just as much as I have in the past, for it is in the society meetings and clinics that we receive new ideas. And it is only by belonging to the society that we can keep up with the times.

Some of you may say that the dental journals help as much or more than the dental society. I admit that a man can derive a great deal of help from the dental journals providing he takes enough time to carefully read them. But how many of us read our journals carefully? We should take the journals and read them, and no doubt we *do* derive a great deal of benefit from them, but *don't* neglect the society. It is by coming in personal touch with each other and seeing practical work demonstrated that we derive the greatest benefit.

To the young men present who do not belong to the dental society I wish to say, "Join at once and attend all meetings." To those members who are not regular in attendance, "Get a little ginger and attend *all* the meetings." You will be well repaid. A few words to the young men: When you attend a meeting, come with the expectation of getting something out of it besides a fifty cent dinner.

If you wish to know anything, don't be afraid to ask the men higher up. Remember, they, at one time, were in the same position as we are, young in experience and looking for help. You will find that they are willing to share the treasures they have stored away during their years of practice.

Consider yourself a sponge and absorb all you can from the meetings and clinics.

You have the opportunity of meeting the best men in the profession, hearing their views on different subjects, and viewing clinics given by them. You go away with higher ideals; with a resolve to make that gold inlay, that porcelain crown, or whatever it may be, just a little better than you have ever done before; or perhaps your ideas on oral hygiene or prophylaxis are rather lax, but after hearing a paper on the subject or viewing a clinic you decide to preach the subject: to be a minister of the gospel of prophylaxis.

Don't go away from these meetings saying that the dental society is no good. If you do, it is yourself who is at fault Remember this, you get out of the society just what you want to get out of it. It is up to each individual to get the benefits found in the meetings. If you come here looking for knowledge you get it, and if you come expecting nothing, you get nothing.

When you are requested to give a clinic, do so, and give the very best that you have, even if you have to sacrifice hours in your office in preparing it. You will be well repaid for your trouble in the encouragement you will receive, and the many pointers you will pick up from men viewing your clinic.

When I think of the many benefits I have received from these meetings I cannot understand why more men do not attend. There are classmates, and others who graduated before I did, practicing in the city, who have not attended a meeting. I met one some time ago who informed me that he didn't have time, as he was busy in his office every night. Think of it! Couldn't spare one night a month to get away from the factory and gather a little knowledge from his brothers. These men are at a loss to know why they cannot command the fees that their more fortunate brothers do. I don't mean by that last remark that all members of the society are securing high fees, but by belonging to the society you can keep up with the times and be in a better position to command high fees. I have noticed this since I have been connected with the dental society.

The men all over the country who are commanding high fees are connected with and take active part in dental societies, both local and national. Why? Because they know that it is in the dental societies that the newest ideas and better methods of doing work are shown and they want to secure those ideas and use them in their practice. So from a financial standpoint it is well to belong to the society.

I have told you briefly what I have derived and what can be derived from membership in the dental society, so to those who are not members I wish to say, "Go thou and do likewise."

In conclusion I wish to take this opportunity of thanking the many members of the society who have so kindly and willingly helped me in the past. and I trust that some time I will have the knowledge to do as much for others as has been done for me.

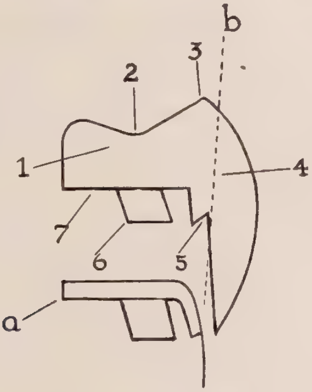
There's only one way to be modern, and that is to avail yourself of every essentially modern device that offers you greater efficiency and facility in your work. It isn't enough that you can "get the work done," with the methods of yesterday; that attitude makes for retrogression. If persistently held, it will land you back in the cave and change your food-getter from an appointment-book to a stone club.

ANOTHER CASE OF NECESSITY BEING THE MOTHER OF INVENTION

BY JOSEPH A. GARDNER, D.D.S., MEMPHIS, TENN.

DEAN COLLEGE OF DENTISTRY, UNIVERSITY OF TENNESSEE

A patient of unusual esthetic taste; a woman of great influence in my city; the wife of one of the big business men of the south, came into my office two years ago, "looking," as she expressed it, "for the dentist that could make her the kind of bridge she wanted, a bridge without showing any gold." I said just what you or any other dentist would say to a prospective patient of that caliber, "I am just the dentist that can make you that esthetic piece of bridge work." Of course I had glanced at the case, and found a broken-down bridge spanning the edentulous space from cuspid to second molar, but I was thinking more about how lucky I was to make such a big "catch" with so little effort, and made an engagement for another day, thinking I would have no trouble making good my promise with some of the interchangeable teeth on the market, but, Oh my! when I came down to earth again, and made a thorough examination of her case, I began to feel a sensation of *"going down."* However, I made no remarks just then. I took an impression and bite for further consideration, and secured the history of the former efforts to make an all-porcelain bridge, viz., about three years previous Dr. A. made her a bridge in which there was no gold showing, but she succeeded in breaking it about two months after insertion, and he made another which lasted



1. Occlusal portion.
2. Sulcus.
3. Tip of buccal cusp.
4. Buccal portion.
5. Shoulder.
6. Retaining lug or post which is porcelain.
7. Flat bearing surface.

B. Imaginary line drawn from the buccal aspect of shoulder 5 through the tooth gingivo-occlusively, coming out buccally to the buccal cusp showing a base greater than the actual grinding surface.

A. The cope or backing.

about one month. Then she goes to Dr. B. and he constructed a bridge using Steele's posterior, the remnant of which was in her mouth when she came to me, which consisted of the lingual half of the occlusal portion of the dummies. The frame of the bridge was also broken where it was attached to cuspid abutment.

The patient has very small features, and especially has she a small mouth with exceptionally small teeth, consequently a very short bite. To add to the former complication of the case, her former dentist had ground the upper first molar and bicuspids flat on the occlusal, making it necessary to grind the artificial lower ones flat on the occlusal also, so the necessary requirements in this case were, first, there must be no gold showing, thereby necessitating porcelain: second, it had to be an artificial tooth that would accommodate a very short bite without showing gold at the gum line on the buccal, yet allowing for ample reinforcement of the frame of the bridge for strength. Third, it must be a tooth which would permit of grinding on the occlusal without exposing the hole or pin used for attachment. To assure strength in the porcelain tooth after being ground flat on the occlusal (the occlusal portion necessarily being very thin to accommodate the short bite) it was necessary that the tooth be sufficiently strong to withstand the ordinary stress of mastication. The case required a porcelain tooth, the base of which constructed so as to be greater bucco lingually than the actual grinding surface without showing any gold on the buccal.

After much thought, worry and work I prepared artificial teeth for this case, embodying the above principles or features out of the ordinary plain teeth used in vulcanite dentures, by grinding a base with flat bearing surfaces, from the center of which rose a lug of porcelain, and to the buccal a shoulder, as shown in the drawing. The bridge was constructed and inserted, and has now been in use one year and eight months. I have seen the case many times and it is in perfect condition today. I have constructed many bridges, the teeth of which were prepared in this manner with happy results. I found it a very difficult and time-consuming task, so I have had them manufactured by special order for the last twelve months. I have not had a single tooth break or become loose in the cope or backing from disintegration of cement.

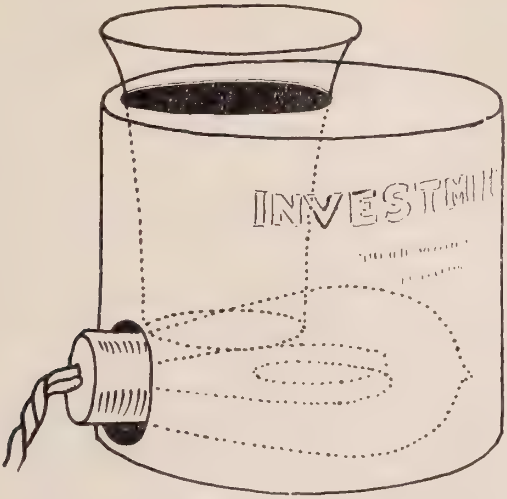
NOTICE

When notifying the publishers of a change in address, subscribers will do both themselves and us a favor by mentioning both old and new addresses.

TECHNIC OF CASTING*

This illustration shows the wax-warming device referred to by Dr. Thomas P. Hinman, of Atlanta, Ga., in his article on "The Technic of Casting," published in THE DENTAL SUMMARY for February.

The device consists simply of an empty plaster or investment box, with lid. A hole is cut in the lid to admit water-glass. Another aperture in the side of the box near the bottom allows the passage of cord and base of electric light bulb.



Wax placed in the water may be heated and "tempered" by the heat from the bulb and kept in proper working condition indefinitely.

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*See article under this heading by Dr. Thomas P. Hinman in February SUMMARY.

PRECAUTIONS NECESSARY, FOR HANDLING TUBERCULAR PATIENTS.*

BY CLAUDE A. SMITH, M.D., ATLANTA, GA.

IN DISCUSSING DISEASED CONDITIONS of the human body, from the so-called dental standpoint, we must not lose sight of the fact that dentistry in the highest sense is nothing more or less than a specialty of medicine. The fact that the colleges teach the anatomical and physiological conditions of the whole body is evidence that such must be the case whether it is generally accepted or not. To obtain the best results in dental practice, it should be necessary for the doctor of dental surgery to understand the physiological and pathological relations of the oral cavity to the rest of the human being; not from a theoretical standpoint, but from a common-sense working basis.

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*Read before the Georgia State Dental Society, 1913.

Only a few years ago the dentist was not expected to concern himself about the diseases which affect the human body elsewhere than in the oral cavity. The fallacy of such a position is being very well recognized even by the laity. There was a time when the average dentist did not consider that tuberculosis was a disease that concerned him or his work. It is now well recognized that the careless dentist may be the unconscious means, by sins of omission as well as commission, of doing great damage in the spread of tuberculosis and other diseases.

While realizing these dangers, let us not go to the extreme of exaggerated conclusions. To thoroughly understand any disease, it is necessary for us to know something of its cause, and if some parasitic organism is the causative factor, we must have a working knowledge of the life history of such an organism.

The classic work of Koch and others has left nothing to be desired as to the knowledge of the life history of this world-wide disease producer, the tubercle bacillus.

When a hunter goes in search of wild animals, he is considered foolhardy, indeed, if he does not first acquaint himself with the life history and habits of such animals, but not in the sense that he must be a zoologist. So, likewise, the dentist or general practitioner of medicine, who would attempt to combat a micro-organism-producing disease in the human body. should have a practical knowledge of the life history and habits of the micro-organism, but at the same time it is not necessary that he be an expert bacteriologist.

The practical, or working, knowledge of the tubercle bacillus comprises comparatively few facts. The germ which produces human tuberculosis rarely grows outside of the human body.

It has no power of motion. When dried and blown around as dust, it dies in a few days. When mixed with sputum and left in a dark, cool place, it may remain alive for several months. It does not multiply in such a place, but waits for a lodgment in a warm living being. Boiling for five minutes completely destroys it. In sputum mixed with 5 per cent. carbolic solution, it does *not* die for several hours. Preparations containing cresylic acid will destroy the germ in a few minutes. The vapor arising from liquids does not carry germs with it. The bacillus may grow in almost any part of the human anatomy, but most frequently finds lodgment in the lungs. It grows slowly, and in the beginning of the disease its effect is so mild that its presence is not generally suspected.

After growing for some time in the lungs, there may be pus formation with gradual breaking down of the tissue. This pus usually contains the germ in great numbers, is coughed up and discharged from the body through the oral cavity. The mouth of such an individual contains millions of tubercle bacilli awaiting an opportunity to be carried to some other human being where they may still further carry on their destructive work if conditions are favorable.

For practical purposes, it is essential that the dentist realize the insidious character of the disease, and its frequent mildness in the initial stage.

When we remember the precariousness of the existence of this organism and the ease with which it is killed and the narrow limits of its existence, it is apparent that its control should not be difficult. In addition to the above, we must bear in mind the natural resistance of the average human being.

It is only by long-continued ignorance of the life history of the germ together with the disregard of ordinary precautions, that the disease has become so prevalent.

It is evident to anyone that if all people who are infested with this germ would observe thoroughly a few precautions the disease would cease to exist within a few years. However, the average person who becomes infected does not suspect it or if told, will not believe it until they have evidence of passing into the advanced stage of the disease when it is known as "consumption." We find that there are hundreds and even thousands of people in every city throughout the world who are in this condition. As practitioners of a specialty in medicine, it is the duty of every dentist to acquaint himself with these facts and to so conduct himself in his professional work that he can be sure that he is not acting as an intermediate carrier of the disease in the lack of care of his office and office instruments, but in addition, as it is well recognized that prophylaxis is of first consideration, he should go farther and co-operate with measures for the protection of humanity at large.

Remembering the number who are surely infected in his community, he should ever be on the alert to recognize incipient cases. In fact, every patient coming into his office should be regarded as a suspect.

The measures to be adopted by the dentist in his office are not difficult or intricate. Bear in mind that the saliva of an advanced pulmonary tubercular patient contains the germs at all times. He must be sure that every thing which touches the oral cavity of his patient is sterilized before another patient is admitted to the chair. This technic is very simple. All instruments should be placed as soon as used in a solution of cresylic acid, or equally strong disinfectant, and remain there not less than ten minutes. If instruments have been placed upon the bracket during the operation in the patient's mouth, the bracket should also be wiped off with the germicide as soon as the instruments are removed. After an operation, the dentist's hands, if they have come in contact with the oral secretions, should likewise be washed in a disinfectant. When I speak of sterilization, I mean that the instruments must come in contact, and must remain in contact with the sterilizing fluid to produce results. Instantaneous exposure rarely ever, if ever, kills any germs. In using any substance to destroy germs, the fact must be borne in mind that it takes time to do it.

Also in the matter of sterilization, I would also like to impress that it is better to have one chemical or other substance that effectively kills germs in a certain time than to have a whole lot of different things. If you find one solution you can depend on, use one solution rather than a whole lot of substances, producing no effect whatever.

Lysol and kindred products have been found to give excellent results.

Next to the instruments and the hands of the operator, the cuspidor is naturally of most importance. If the flushing cuspidor is not in use, the ordinary cuspidor should at all times contain a solution of the disinfectant, but in disposing of its contents, bear in mind that masses of sputum require considerable time, often many hours, for thorough penetration by the disinfectant. Therefore, when emptied upon the surface of the ground, such sputum may be a source of infection to others. After being emptied, the cuspidor should be thoroughly washed with the disinfectant. This applies as well to the flushing cuspidor.

In addition to the above, careful attention should be given to the daily cleaning of the office. As far as possible the furnishings of the office should be selected with a view of avoiding the collection of dust. If possible, rugs and carpets should be excluded. If used, vacuum cleaning is necessary to keep down dust and its accompanying dangers. Brooms and feather-dusters should not be used. All furniture should be wiped off daily with a cloth to avoid raising dust, and wiped with a disinfectant at least once a week.

Last of all, the dentist must be sure that he is protecting himself from infection, as well as from acting as an intermediate carrier of the disease. The breath of a tubercular patient does not carry the germ. It escapes from the mouth only by talking, spitting, sneezing or coughing, or when removed by actual contact as above mentioned.

The dentist should endeavor to avoid the microscopical spray from the mouth of coughing, sneezing or talking patients. Last of all, we shall speak of the most important practical agent it is possible for the dentist to cultivate: that is the natural resistance of the individual. After centuries in search of drugs to cure this disease, the experience of the sanatoria scattered over the world, within the last few years, has shown that in the natural resistance of the human body, we have the greatest curative factor of all. We find that patients who are moderately advanced, can frequently be made to throw off the disease entirely by developing their natural resistance. Also we find that the majority of individuals, especially in the cities, have at one time or another become infected by this germ, but have gotten rid of it without being aware of the presence of the disease.

Finding then that by developing this natural resistance we can actually cure individuals who have become badly infected, it is only reasonable to conclude (and we have evidence to show that it is really true), that by developing this resistance *before* exposure to infection, that infection rarely takes place. This development of resistance consists in the simple observance of natural physiological laws. The public at large is beginning to realize that this is true and are beginning to look upon the practitioner of medicine and its specialty of dental surgery as models to be followed in their observance of these laws. The practitioner of dental surgery must realize that the knowledge of physiological laws which he gained in college must be put into his daily practice. He has learned that the human body is a high-grade delicate machine and that he is the engineer to look after its proper running. When properly run, we find that this human machine has the power to manufacture substances which protect it from invasion by many of the parasites which are now prolific producers of disease.

We have evidence to show that the majority of the people in the cities are frequently exposed to infection by the tubercle bacillus, but even under existing conditions of careless handling of the human machine and disregard of physiological laws, most of us still possess the power of preventing serious infection by this germ. To sum up briefly, it is necessary that the dentist observe a few precautions which will prevent his being the means in his daily practice of transmitting the germs of tubercle bacillus from one individual to another, including himself, and that he must also practice and preach the application of natural physiological laws, which will do much toward preventing infection when actual exposure cannot be avoided.

THE TRUE FAITH

There is a conductor on the "Southern Pacific" in California by the name of Stafford—runs from San Francisco to Fresno—who always wears in his lapel a red moss-rose bud, and has buttoned under his blue coat a heart full of the True Faith.

"Ever off the irons?"

"Never!" said Stafford—"and never expect to be, and I've been in this business for twenty-six years. This train and this track are all right; I just center on my work, and have faith that everybody else is doing the same, and let 'er go at that."

And the conductor disengaged the half-blown rose from his buttonhole, and handed it to me. "Oh, take it, I've got a basket of 'em in the baggage car," said he, and passed on through the train.

When he came back I tried to talk to him further, but he had nothing more to say.

We killed time running into Fresno, and slowed down on the minute.

An inward peace comes when you have faith that things are all right. This faith brings good health, and good health comes from an inward peace.

To think clearly and act wisely there must be a calm at the center—peace.

Doubt, distrust, uncertainty, apprehension, are destroyers of peace, and mark the first stages of dissolution. We could all live to be a hundred and never once "get off the irons" if we had faith in ourselves and faith in this Eternal Something of which we are part and particle.

FORTY-EIGHTH CONVENTION OHIO STATE DENTAL SOCIETY

HEALTH AND SCIENCE CONFERENCE

(*Continued from February* SUMMARY.)

DR. PRICE: Gentlemen, there is one thing that we all have before we go to look for it. Did you ever realize that the only reason you ever looked for a truth is that you already have some of that truth in your own heart and mind? "Thou wouldst not have sought me, hadst thou not already found me" is another way of expressing it. The man who will now address us is a man who has had a vision. All during his lifetime he has had a truth, but it has not been the whole truth, and he has been urged on because of that vision, and growing out of that vision has come a knowledge of obtaining truth. Dr. Kirk will now speak to us on the subject, "Exact Knowledge and How it is Obtained."

EXACT KNOWLEDGE AND HOW IT IS OBTAINED

BY EDWARD C. KIRK, D.D.S., SC.D., PHILADELPHIA, PA.
DEAN OF THE THOS. W. EVANS MUSEUM AND DENTAL INSTITUTE SCHOOL OF DENTISTRY, UNIVERSITY OF PENNSYLVANIA; EDITOR OF THE DENTAL COSMOS

Mr. Toastmaster, I wish to say that I arise with some mental disquietude on this occasion, for the reason that since I have been in Toledo and witnessed the procession of great events that have taken place in this meeting of the Ohio State Dental Society, and when I discovered that in the several activities here represented the distinguished gentleman who is acting as our toastmaster this evening has been the head, front and guiding force of them all, I have been filled with a feeling of fear lest I might come here and make the *faux pas* of addressing him not as Mr. Toastmaster, but as Mr. Ringmaster. (Laughter). But let me say to him as toastmaster of the evening that when as the distinguished President of the Ohio State Dental Society he telegraphed me, asking me to come and speak upon this occasion, I first accepted the invitation, and then sat down and carefully read his telegram, and I found that the topic that he had assigned to me was "Exact Knowledge and How it is Obtained," but the more I thought about it, the less I understood what it was he wanted me to talk about, and for some time the only thing I could see in the subject was what is implied in the incident of the witness who testified in a murder trial that he stood seventeen feet, eleven and three-quarters inches away from the prisoner when he fired the fatal shot, and on cross-examination the attorney said, "Well, now, you have testified on your oath that you were seventeen feet, eleven and three-quarters inches away from this man, the prisoner here, when, it is alleged, that he fired the fatal shot. How do you know that?" "Well," the witness said, "I thought when I saw him do it than some damn fool might ask me that question, so I just went and measured it." (Laughter).

But when I came to consider all that the sentiment expressed in the toast meant, the thought grew in my mind that Dr. Price certainly did not want me to come here and discuss technical methods in research, because he knew all about that himself. It must mean something more, so I find myself in the position of the little boy who was sitting at his mother's feet with his slate, drawing a picture of father. And the boy worked and labored over his drawing until his mother said, "Let me see it," and he showed it to her, and she said, "Yes, that looks very nice; that looks very much like father," but the boy was dissatisfied, and said, "No, mother, it doesn't look like father at all; I can't do it; it is impossible. The only thing I can do is to put a tail on it, and make a dog of it." (Laughter). So, following the boy's example, I have taken the liberty of interpreting the sentiment of this toast in other terms. "Exact Knowledge"—what is exact knowledge? It seems to me that there is a shorter and more beautiful word that describes it, namely, "Truth:" and "How it is Obtained." The toast then may be briefly paraphrased as "How Shall we Find the Truth?" I will ask your indulgence for a few moments while I say something about that.

It seems to me true, just as our President has said, we must have something of the truth in us, or we would not seek for more. That is to say, we must have an appreciation of the importance—more than that, of the necessity of the truth. We must realize that the truth is a good thing and from the appreciation of the value of truth will come the desire to obtain it. That, as I see it, is the meaning of the toast which has been assigned to me.

I remember upon an occasion some years ago that someone came into the meeting of the Dental Society of the State of New York with a report of research work in some department of dental inquiry and every one present was impressed with the importance, not only of the findings that were reported at that time, but of the value of the method and the purpose of such work, and, as always happens in a moment of inspiration when the truth is made manifest, someone wants to build a tabernacle and the building of a tabernacle on that occasion took this form: "This scientific research is a good thing, we must have more of it" and with typical New York spirit they passed around the hat with a view to raising a fund for the subsidizing of scientific research. That is characteristic of the locality; they not only passed around the hat, but they nearly filled it. I think that some fifteen hundred dollars was collected there just in a moment—if not that much money at least pledges to that extent and thereafter some seemed to think that scientific research was to be bought somehow and paid for out of that fund.

Now, I want to lay down the proposition that scientific research is not a purchasable commodity. You cannot buy love and affection; you may get a sort of passable imitation of it, but it is not the real thing, and there is nothing genuine but the real thing. However, the raising of the fund was a step toward something. It was the material expression of a need, of a desire, of an appreciation of the value of this seeking for the truth that we call scientific research, and so in the process of time it was possible to enlist the activities of men who were interested in exact knowledge and how to obtain it, and the fund did eventually produce its results in terms of truth.

It is concerning that tendency to believe that scientific research can be bought, that we can purchase the truth, that I wish to speak for a moment. I fear very much that that attitude of mind is the outgrowth of our modern educational methods. If we look over our systems, or so-called systems of education, we find a demand everywhere for the practical, meaning by that, the utilitarian in education.

We are obsessed with the idea that there must be an intensely practical outcome for all of our educational work. Our conception of the practical is something that can be converted immediately, or very quickly, into terms of dollars and cents. Scientific results that can be bought with money are always open to the suspicion of being tainted by self-interest whereas scientific research for the love of truth itself is an activity beyond the influence of self-interest.

I am not in a position to, nor do I ever intend to, minimize the importance of the dollar. We should respect the dollar as a means to an end, but not as an end in itself, for as somebody—I think the late Judge Tourgee—expressed it, "Working for the dollar as an end in itself, is like working for the devil and boarding yourself." This hunger for the utilitarian seems to have obscured another very important, and to my mind the most important, if indeed it is not the true, end of education, and that is that spiritualizing factor in education which enables the developing mind, not only to recognize the truth when it sees it, but to love the truth above and beyond every other consideration. Has it not been said by the Greatest Teacher of all that "For this cause shall man leave father, mother, brother and sister?" It is something of that spirit that we need most in education, the inculcation of a belief that the truth, first, last and all the time, and above everything else, is the ideal toward which education, all life should tend.

It is only by the appreciation of the truth that we attain real education. It is only by the spiritualizing of education that we are able to develop that attitude of mind which qualifies us to go before the unknown, the unseen in nature, realizing that it is the materialized expression of the Divine idea, to approach the temple of truth in a reverent spirit, with clean hands and a pure heart, so that we may understand something of her teaching, and interpret the language of nature in such terms that when we have received the message we shall be able within our sphere of action to transmit it for the healing of the nations. I cannot express to you the thought in my mind, as well in my own terms as I can in the words of another, therefore, let me quote from an address made by Mr. George Wharton Pepper, an eminent member of the bar, a trustee of the University of Pennsylvania, and perhaps the most prominent layman in the Episcopal Church in America.

Speaking upon this point he says, with respect to the kind of education that we are giving to the young in this land: "We do our best to create in the mind of the student the impression that mathematical proof and the methods of verification familiar to physical science, are the normal and universal criterions of truth. Later, and half apologetically, we suggest to him that there are exceptional cases, in which truth may be established in other ways. Instead of pursuing so unscientific a method, we should early open the mind of the student to the whole problem of ascertaining the unknown. The means by which he becomes aware of his own existence, of spirit, of love, of friendship, and the other great realities of life, should be made known to the student in their true relation to the investigaton of the unknown in the sphere of number by mathematical processes, and the exploration of space by the telescope and the inquiry into the properties of matter through the microscope and the spectroscope. The astronomer who observed sententiously that for many years he had swept the heavens with his telescope without finding God would have been preserved by such a system from showing himself ignorant not only of the nature of God, but of the proper limits of his own chosen sphere of investigation."

What I have to say, then, is a plea for the inclusion somehow in our educational system of a recognition of the spiritualizing quality in truth, something that has been otherwise expressed as a method or plan, by which the student shall be taken from the contemplation of nature up to the appreciation of the God of nature; that we shall develop in him a God consciousness. It is that ideal and that quality which we must put into our education before we can have real education or the best results in scientific research. How are we to get those desirable results? This necessarily implies the educated teacher, the one who has that quality in him that will enable him to develop it out in the minds under his care. There are such men, there are such people. In this nation of ours, where the practical is so dominant in our life today, we have scarcely had age and experience enough to enable us to reach the stage where we have developed the sort of schoolmaster that respects his calling as he ought to, the consecrated man, a man that believes, and rightly believes, that the duty before him and the responsibility upon him of developing the minds under his care is the highest calling that is given to humanity.

In the older countries we recognize an attitude of thought toward the centers of education entirely different to that which we have represented, broadly speaking, in our American universities. The American university student speaks loudly of his loyalty to his institution. It is always the institution that is in his mind in its claim upon his allegiance. He forgets the personality of the faculties, but he always remembers that he is a product of his particular Alma Mater. We see the best examples of that feeling expressed in our inter-collegiate athletic relationships. There is a rivalry among the respective student bodies based upon their loyalty to their university. When you speak with a man who has had his education under continental methods we find that he has incidentally been to a university, perhaps several, but he has had his mathematics under this man, or he has had his pathology under that man, or his chemistry under some one else.

It is always the individual teacher to whom he refers with pride, for it was from this or that one that he received the impulse of his life work through personal contact and inspiration derived from that particular authority or mind. We need to develop some of that same feeling not only in our higher centers of education, but it should be characteristic as well of our educational work in the primary and secondary grades. The influence of the teacher should be a personal one, because it is only through the influence of the teacher that the inspiration which leads to a right attitude toward truth and the discovery of truth is conveyed to the developing mind. As to exact methods of research, the subject is too broad for me to more than refer to it. You have started here a center of activity in the search for exact knowledge under the inspiration of a man who has been touched with the Divine touch of truth. There is radiating out from him an influence in every direction that is stimultaing an interest in this thing that I have been talking about. Personal contact with him and the men that he has infected with his idea will be the saving grace in this splendid effort that is being inaugurated here, and which through the instrumentality of our National Association will, I sincerely believe, put the dental profession, in the course of time, in its proper position as an important and necessary department of the great science and art of healing.

I could not help thinking, when my distinguished predecessor was referring to the splendid work of the medical profession, of that anomalous condition which is presented by the results they have obtained and the spirit which has animated the work toward those results, producing, as someone has expressed it, the spectacle of a profession cutting off the limb of the tree which supports it, but as Dr. Vaughan was speaking of his feeling about that phase of the situation I had a sense of comfort when I considered that after we practitioners of dentistry have done all we can for prevention, and after we have thus cut down our sources of income to a point where we cannot spend any more money for automobiles or for scientific research, we shall at least not be dependent upon those domestic traumatisms that he referred to, where the man murdered his wife or the wife murders the husband, but we shall be dependent solely upon that great majority of society, the negligent, who have not as yet, either of their own volition, or by legislative enactments, been required to seek the services of the dentist. (Applause).

(To be continued.)

BUSINESS · SUGGESTIONS

Our readers are urged to send business suggestions for this department that there may be an exchange of ideas that will be mutually beneficial. Send all contributions to the editor,

L. P. BETHEL, 195 SIXTEENTH AVE., COLUMBUS, OHIO.

THE BUSINESS SIDE OF DENTISTRY

BY "A BUSINESS MAN"

THE DENTIST'S ACCOUNTING

The dentist should keep an accurate account of all transactions of every sort and should be able to know at any time the exact condition of his affairs. To do this it is necessary to know exactly what is due him and also what he owes. He should be systematic in his work. He should leave no transaction to be entered in his books at some future date. Immediately upon dismissing a patient a memorandum of the entire transaction should be made, including time and material put in, and money paid. By this means misunderstandings cannot occur and one's books are reliable.

Accounts between the dentist and those from whom he buys should also be accurately kept. No reputable dealer desires to make mistakes or to defraud and they all exercise every precaution; but errors do sometimes occur, and the dentist should so keep his accounts as to enable him to know whether or not the statements which he receives are correct.

ACCOUNTS RECEIVABLE AND BILLS RECEIVABLE

These terms mean all the money due from every source. Such accounts are run solely for the convenience and accommodation of the party receiving credit. Before extending credit a dentist, like any other business man, should assure himself of the character and reputation of the man asking credit.

A dentist should know before he begins a piece of work how the bill is to be paid; misunderstandings will then be averted. A dentist would think nothing of being asked by a merchant in any line of business to whom he might apply for credit, what his ability to pay is, and that references be given. A dentist should use the same business sagacity and insure himself against losing any portion of his accounts or bills receivable.

Accurate accounts should be kept of all money due and payments exacted acordingly. This is good business.

THE DENTIST'S ACCOUNTS PAYABLE AND BILLS PAYABLE

These terms cover all of one's indebtedness of every sort. It should be the habit of every man to discharge his every obligation punctually according to the agreement made at the time of purchase. All current bills of every kind should be paid in cash promptly on receipt of statement or on the first of the month.

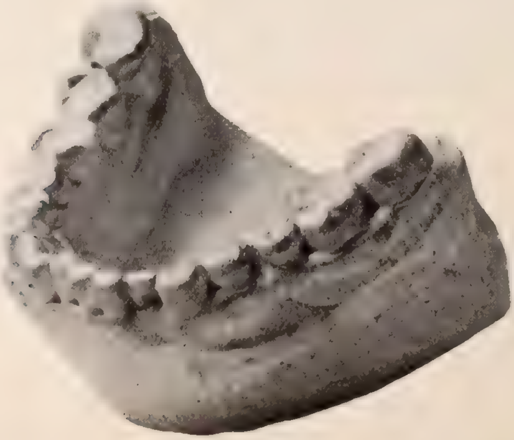
No dentist should run local bills with the idea that they are to be traded out. Local merchants will be much more appreciative of cash settlements and much more likely to throw their patronage to the man who makes cash settlements. That is the implied understanding when purchases are made and the merchant may reasonably expect cash as agreed. No dentist should compel a merchant to give him his patronage grudgingly and in self-defense.

If you buy equipment on time, the notes representing the unpaid balance should be met at the bank on the day they become due, thereby proving to the bank that you are keeping accurate accounts, that you know the date the obligation matures, the exact amount, and that you are prepared to meet it. A business man is expected to do that and you wish to be recognized as such.

A dentist's bills with his dental dealer should receive immediate attention the first of each month. The dental dealer, like all other merchants, appreciates most those customers who pay their bills without delay, and it enables *him* to meet *his* bills promptly.

A REMARKABLE DENTITION

REPORTED BY DR. J. O. GOODSELL, SAGINAW, MICH.



Patient male; occupation, carpenter; age, 67. Called to have five superior teeth filled. Had previously lost five upper teeth.

I found seventeen perfectly sound teeth in lower jaw, two centrals deciduous, and left third molar still unerupted.

The case is unique in my experience. I would like to hear from other practitioners on the subject.

OBITUARY

Jacob Frick Frantz, M. D.—1852-1914

Dr. Jacob Frick Frantz, President of the Dentists' Supply Company, died on Feb. 7th after an interesting and eventful career.

Dr. Frantz was born in Lancaster County, Pennsylvania, July 29, 1852, and was educated at the Millersville Normal School and the Hahneman Medical College, from which latter institution he was graduated in 1876.

Immediately after his graduation Dr. Frantz entered upon the practice of medicine and in the prosecution of his professional duties came into contact with certain persons who were engaged in the manufacture of porcelain teeth. The possibilities of development of this infant industry appealed to him, and he was drawn more and more into connection with it until, in 1879, he organized The Wilmington Dental Mfg. Company whose products are still referred to with admiration by dentists whose experience goes back to that time.

In 1895 Dr. Frantz moved to New York and became President of The Consolidated Dental Mfg. Company, a position which he held until 1899, when he became President of The Dentists' Supply Company.

In the fifteen years since this company was organized it has risen from a comparatively unimportant position to recognized leadership in its field. Its products are used in every quarter of the globe and many methods which it has either originated or aided in presenting to the dental profession are now matters of routine practice with thousands of dentists.

In the organization and development of this company, Dr. Frantz found expression for his genius in selecting and developing men. He set before them visions of achievement and inspired them with determination and courage to transform those visions into facts.

Dr. Frantz endeared himself to a host of friends by a rare combination of lovable qualities, of which perhaps the most prominent was his quick and intelligent sympathy and his readiness to lend aid, often at personal inconvenience to himself. He had that rarest of all gifts, the ability to put himself in the other person's place, and he applied to the solution of whatever trouble presented, his powerful imagination, his clear vision, his great business ability and his power to interest others. Each one of the great staff of employes, which has grown up around him, feels that Dr. Frantz was his personal friend, and each feels the loss not only of the inspiring leader but of one to whom he could turn for interest and sympathy.

Dr. Frantz not only made for himself an enviable place in the activities of his chosen commercial field, but his abounding vitality overflowed into many activities for the good of his home community, New Rochelle, N. Y. Some of his more prominent activities were as follows:

Director, National City Bank, New Rochelle; Trustee, People's Bank for Savings; Trustee, First Presbyterian Church; Trustee, Young Men's Christian Association; Trustee, Home for the Aged; President, Beechwood Cemetery Association.

He was a member of numerous organizations, as follows:

Republican Club, New York; Pennsylvania Society of New York; Republican Club, New Rochelle; City Club, New Rochelle; New Rochelle Yacht Club; Wykagyl Country Club; Huguenot Society.

Resolutions

On the death of Charles A. Meeker, D. D. S., ex-Secretary of the New Jersey State Board of Registration and Examination in Dentistry.

Whereas, In the providence of an All-Wise Creator, our fellow-member, Dr. Charles A. Meeker, died September 8th, 1913, and

Whereas, His indefatigable industry, his record as an examiner, his skill as an organizer and systematic developer of the New Jersey State Board work for a period of time covering twenty years has placed him without a peer among eminent examiners; now, therefore be it

Resolved, That we, the members of the New Jersey State Board of Registration and Examination in Dentistry, deeply deplore his loss, and express our great appreciation of his long and intelligent services; and be it further

Resolved, That a page of our Minute Book be inscribed with these resolutions and a copy of the same be sent to his bereaved widow and to the professional journals for publication.

(Signed) HERBERT SANDS SUTPHEN, D. D. S., *President,*
ALPHONSO IRWIN, D. D. S., *Secretary,*
WILLIAM E. TRUEX, D. D. S.,
VERNON D. ROOD, D. D. S.,
CORNELIUS KIEL, D. D. S.,
CHARLES P. TUTTLE, D. D. S

THE PERENNIAL ONE

You're a bloomin' lively visitor and I am glad you're here, Although I can't believe your talk the way I did last year; Then your siren song enwrapped me, and your blossoms bright I took, And though the snow was two feet deep, my heart sang like a brook. 'Twas springtime, gentleannie, and the flowers bright that you put in my hands were gor-ge-ous, Although they never grew! Yes, once beneath your mystic spell, All else is lost in fog; That's why I pass you up this year—You flower catalog!

THE DENTAL SUMMARY
THE MAGAZINE THAT HELPS

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The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

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REGULAR CONTRIBUTIONS

SOME CONTRIBUTIONS TO DENTAL AND MEDICAL SCIENCE*

A REPORT OF PERSONAL RESEARCH

BY WESTON A. PRICE, D.D.S., CLEVELAND OHIO

I AM GOING TO BE as brief as possible in reporting to you several lines of research that I have been making during the last several years, and which, so far as I know, have not been reported heretofore. I am going to ask you to anticipate that I shall be somewhat disconnected and abbreviated because of lack of time. I shall hope to cover eight different subjects, each of three of which should take an entire evening.

SILICA CEMENTS.

I first wish to speak of some researches on silica cements. You are all familiar with the directions that come with our various packages, which state very specifically how we shall mix, how long we shall wait for the cements to set, how we shall treat them with regard to moisture and protection with regard to waxes and oils, and this line of experimentation was directed to develop these two points: whether or not such substance as we should put over the surface of the cement would seriously injure the quality of that enamel cement, and also as to whether its strength, surface quality and color would be affected thereby. First, we found, with a series of experimentations with regard to the ingredient that was used to put over these cements, that the vaselines, the paraffines, and practically all the waxes, were solvents for the colors to a certain extent. The most important point that we were working for was to get information pertaining to the setting time. We are instructed to leave the rubber dam in place for thirty minutes in order that our filling may be very hard. That question of time is so important an element for both the members of the profession and for the laity that our effort was directed toward reducing that time, if possible, and we found that the addition of heat up to 175 degrees F. did not increase the total contraction seriously—perhaps one-tenth of one per cent.—did not affect the color, did shorten the setting time from one-half to one-fourth, made a stronger, harder filling under the crushing tests after 24-hour wait, and in every particular seemed to make as good or a better filling. That, in substance, is the most important result of that series of researches.

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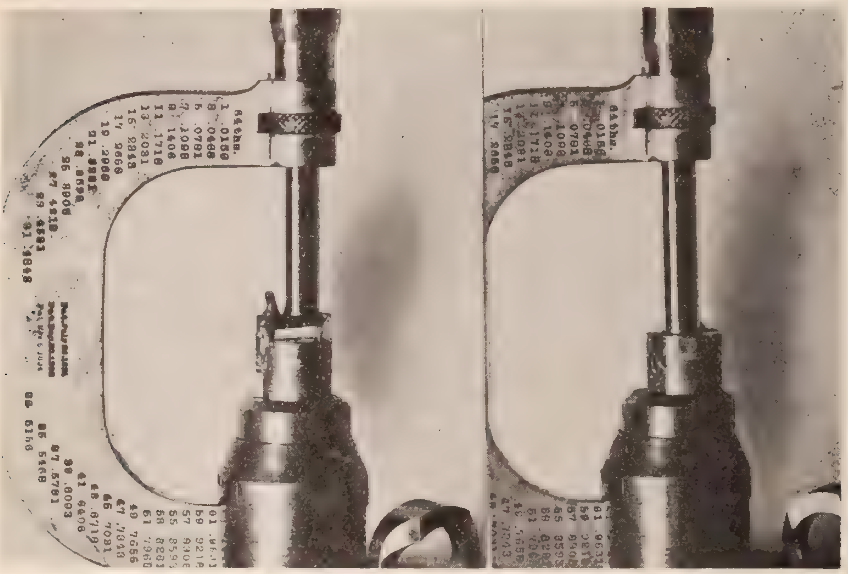
*Given as the President's address, Ohio State Dental Society, December, 1913.

AUTOGENOUS VACCINES.

The next item I wish to speak of is that pertaining to systemic invasions of infections when treated by the vaccines when the infection seems to have come from the mouth, and particularly as pertaining to the relative value of autogenous and stock vaccines. The first series were all selected because they had marked systemic invasion. We could not prove that the invasion originated in the mouth. It perhaps did not. The cases were selected because there were gross lesions in the mouth and because the patients were suffering very serious systemic invasion from some source. In all the cases treated with the stock vaccines we found no important changes or a slight temporary improvement. In the next series which were selected because of their very grave systemic invasions, and with the possibility of a mouth origin, we found that every one responded in some degree to advantage with autogenous vaccines, and some very markedly. I am in hope that Dr. Ladd in his discussion tomorrow will speak from the technical side as to the result of these treatments, as I secured his services for making the vaccines in order that we might have the greatest skill possible along that line. In one case which I wish to recite in detail the changes in the entire picture were so great that we rarely see, even in people recovering from a serious fever, a more prompt and more definite improvement. A lady holding a very prominent position, with a great deal of responsibility, had notified the authorities that she must give up her work, because her health was declining so rapidly. I have been watching her for about 18 years from a dental standpoint, and have noticed that periodically her general constitutional picture changed. She would leave her work and go away for a few months to recuperate, and after a rest would come back to her work, only to go down again. Some time ago, when on the Pacific coast recuperating, she developed an abscess on the hip and very promptly after the formation of that abscess she had a very prompt improvement in her symptoms. I mention this case because of the grave systemic picture, not because of serious local lesions. The lady rather demurred when I suggested a vaccine treatment. I recommended that she should have her consulting physicians confer with me to see whether or not it would be an advisable thing to do. A consultation was had, and her three consulting physicians said: "It may do some good; probably not. It probably will not do any harm; try it, anyway." The culture produced a pure streptococcus from which the vaccine was made. The changes in her clinical picture were that she had a very prompt and sharp reaction and immediately after the reaction a temporarily increased flow of pus from around the teeth, which was probably partly due to what was for her too large a dose, and it was not a very large one, either. The picture changed very rapidly. Her health became very much improved. She notified her officials that she would come back and take her position at the head of that institution another year if everything went well. This was happening in May, 1913. In June she was superintending fifteen plumbers and carpenters, enlarging the dormitories. At the time of the commencement exercises, when the load was doubled and when she had expected that she would break, she said she was feeling better than she had for months, if not for years. She now looks almost as plump and as rosy as a country school girl, and is doing her work as she has not for many years. (Applause). And I want to say that the lesson to me is that she probably has been suffering from a very definite invasion arising in the mouth from those chronic innocent-looking pyorrhea pockets that I have been trying and trying to keep in a condition of toleration, and the accumulation of that poison and that invasion was marking the crisis.

CONTROL OF CONTRACTION.

The next subject I wish to speak of is the result of just one phase of the researches we have been carrying on relative to substitutes for platinum, and I shall discuss only this phase of it, namely, the progress we have made in controlling the contraction of gold. That was spoken of this afternoon, and I will ask the gentleman at the lantern to start the pictures at this time, and we will see a picture of an inlay that is made with this method of control, and it is made in an m.o.d. chamber. This form is one that the contests are being made in for a prize of $150.00 offered by the speaker for the person who would first make a restoration that would have an error of not more than 1/50 of an inch in the seating of an m.o.d. inlay, and we find that the average best operation that we may make when casting inlays and undertaking to control the contraction, with all our best methods, will still leave us an error that we can not control that will prevent an inlay from going to a more nearly perfect seating, where the cavity walls have an angle to each other of one per cent., than 180/1000 of an inch if the depth of that cavity is one-quarter of an inch. The average best inlay, in fact the best, so far as I know, that has been made in that cavity form, in which the cavity surfaces are at one per cent. bevel to each other, will not go to place nearer than is shown in this picture (Fig. 1) which is 183/1000 of an inch. The placing of a threaded Tungsten bar in that mass of metal which extends over the occlusal step will give us a large control, because the Tungsten bar is relatively so strong and has relatively so little contraction that the mass of gold is held, as we will see by the next picture. (Fig. 2). This inlay goes to place within 19/1000 of an inch. The requirements for the prize is twenty thousandths or 1/50 of an inch. I wish to speak of this in connection with the discussion of this afternoon to the effect that many men are abandoning the casting process for m.o.d. fillings particularly because of their inability to control the contraction sufficiently to make as nearly perfect restorations as are desirable. This is one element to assist us, for the Tungsten bar so nearly controls the contraction of gold that it allows the inlay to go to place.



Figs. 1 and 2.

MUSIC FOR SUGGESTION AND RELIEF FROM NOISE.

The next series of studies we wish to present are new devices that are designed to relieve in part the disagreeable sensations due to the vibrations of the bur in working on the tooth structure and for suggestion in anesthesia. You are all familiar with the simple experiment of taking an instrument with a rough handle and drawing another instrument across it; when removed from the tooth the patient will not hear it, but when you touch the end of it to the tooth they hear it as a very loud noise, a disagreeable sensation and vibration. I presume that today the vibration and noise element is the greatest discomfort to our patients of any that is still not removed. This instrument, then is designed to remove some of that discomfort. The researches were carried on along the following line: A phonographic instrument was put some sixty feet away, and out of hearing, and a wire attached to the vibrating diaphragm of the phonograph, and also against the tooth. While the patients could feel very little vibration from the bur, they could hear the music with perfect distinctness over that wire. The suggestion, then, is to inhibit that noise that comes through the tooth and bones from the bur by placing into the ear a volume of noise that is not disagreeable. It may be instrumental music, or a recitation, or a beautiful solo, and is heard only by the patient. (See Fig. 3). We have changed an ordinary graphophone by using solenoids to make the four-minute record repeat over and over without any adjusting until a new record is put in. (See Fig. 4). Another solenoid is connected with the foot engine or controller of the dental engine (Fig. 5) and each

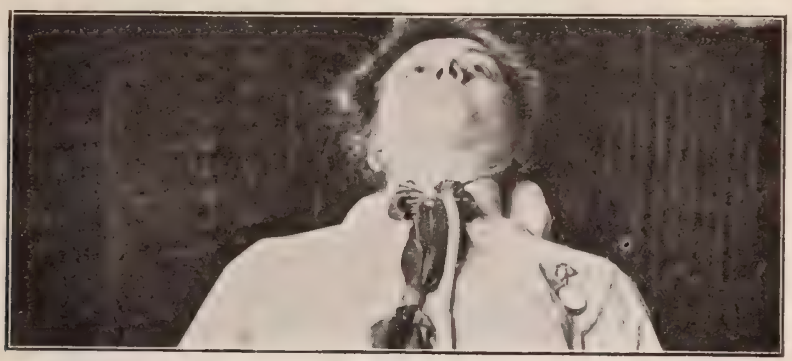


Fig. 3.

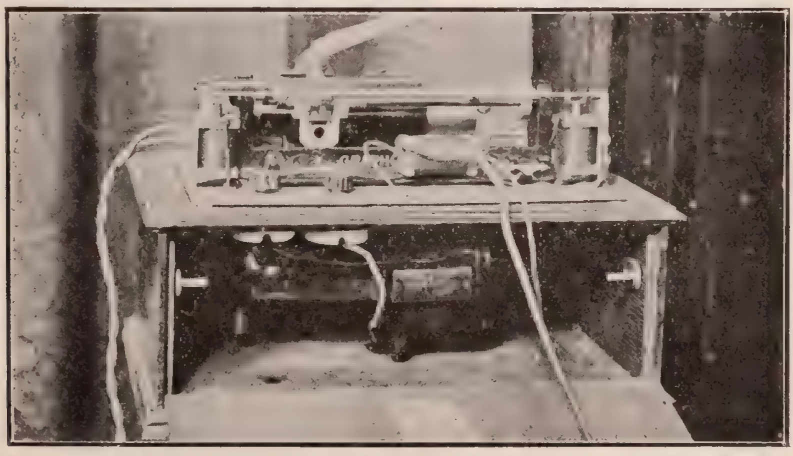


Fig. 4.

time the bur is turned on the music starts, and each time the bur stops the music stops. If they want any more music we must also start the bur again. (Laughter). The result, for children, is remarkably good. I have been able to prepare cavities for little folks, one after another, without expression of unpleasant sensations on their part, and their expressing continually a desire that I would start the music again. Where before I could perhaps prepare only one or two cavities at a sitting, I can now frequently prepare four or five or six cavities. I don't wish to say that the "babies cry for it," (laughter), but it is an advantage that I believe will be worth a great deal to us, particularly for our little folks; and I find that the big folks very often, in fact generally, desire it as well as the little folks, for the same psychological action takes place with the big folks as with the little folks.

Fig. 5 shows all that is added to a foot controller, simply a little switch attached to the top of it, and which will go onto any controller It automatically turns off and on the music as the engine is started or stopped. The attachment to the patient is through small ear tubes as shown in Fig. 3. It is rather more convenient to let the patients hold it in their own hands, removing it at will, and replacing it. They feel then that they are not bound or tied in any way. It is not at all in the operator's way. Another method of applying it is through the bur but that method is not so satisfactory because of the continual interruptions by the bur being moved out of the cavity and not making a perfect contact. Still another method is through small telephone receivers specially designed and attached to the head rest. This is used with great advantage by the speaker in all analgesia and anesthesia operations and he believes it will come to be generally used in these operations.

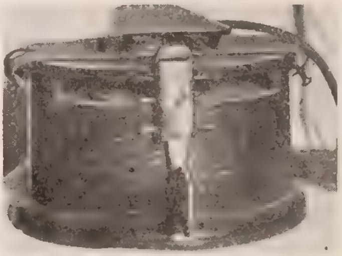


Fig. 5.

AUTOMATIC CLINICAL RECORDER

The next series of studies is along a line for helping our poor unfortunates that are in the hospitals. I think many of you have had the misfortune of lying on your back day after day with typhoid or some other fever, and have had the nurse come around at too-frequent periods and poke something into your mouth and tell you to keep your mouth shut for three or five minutes, and take your temperature and your respiration, and in the intervening time you had various kinds of misgivings, for fear

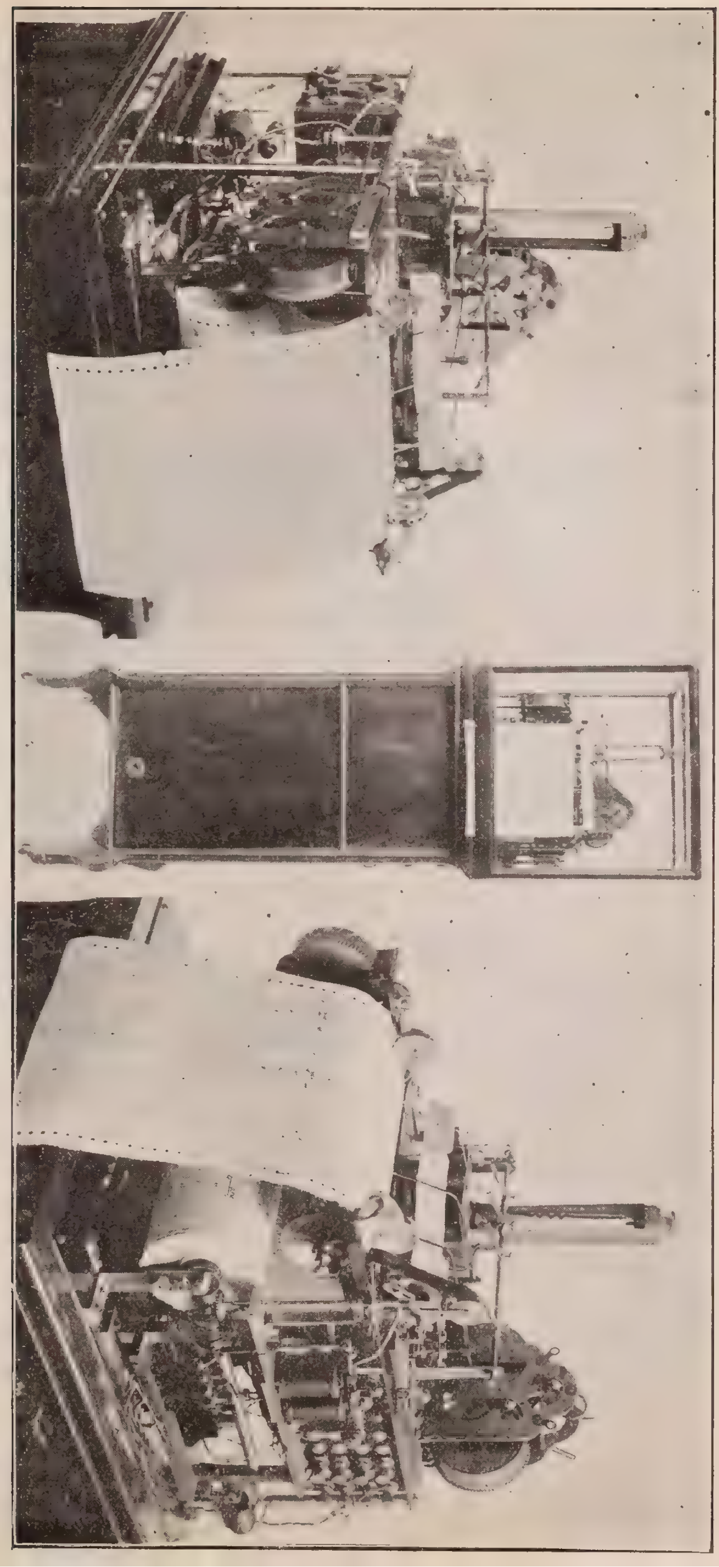


Fig. 6.

your temperature, respiration and pulse were getting away dangerously high. Many of us have felt or seen that excitement in a hospital and have seen a crisis and death come to a fellow sufferer between the time of taking these records, and that not known by the attendants, when, if some one could have known it, artificial heat could have been applied, stimulants could have been used and a life saved.

It is for these people that this next series of researches has been made. Some twenty years ago I myself was in—I was going to say a campaign of typhoid. It was one of those deadly scourges that pass over a great city or town sometimes. I was in North Dakota, and when I found myself coming down with the fever, I had some of the water bottled up and sent to Dr. Vaughan, at the University of Michigan. He doesn't remember it, but he telegraphed back, "Full of deadly typhoid germs. Be careful." In a town of 6,000, if reports were correct, 1,600 developed typhoid, and 600 died -ten per cent. died, and twenty-five per cent. took the disease. While lying on my back there, and after being moved down to Minneapolis, I was working in my mind on this instrument, for some method to take the clinical record, if possible, regularly, and mark it down. Later, when working up the pyrometer for the dental profession, I designed an application of the pyrometer to the patient that would be comparable to its application to a blast furnace; for the same pyrometer that I designed for the dental profession is now being used for those commercial industries that desire to know their working temperature. The speaker, however, has no interest in its sale or manufacture. We have been devoting about fifteen years to the development of this instrument, (Fig 6), which records, on a traveling sheet of paper the temperature, marked down every minute of the twenty-four hours, the respirations marked down every minute, and if there is a heart lesion that gives us an exaggerated motion of the heart, a record also of the heart beats, which are marked down every minute; and if at any time any of those elements go too high, or too low, at the end of the minute a warning signal is made by the lighting of a light or by the ringing of a bell, or both. Fig. 6, right and left, shows a detail side view. Mr. Lee is now recording his temperature and his respirations and you will notice that if he is breathing more often than a patient should it will set a bell ringing somewhere—it could as well be in some other part of the building; it can be in the superintendent's room of the hospital, or it can be in the nurse's room, or both. And the adaptation of the instrument is not simply to one patient, but to as many patients as there may be in a ward. Let us suppose there are twelve patients in the ward. The instrument will record one of those for five minutes, and then another for five minutes. Now it is giving a signal in the superintendent's office, because that patient's respiration rate is too high. (A bell rang in another part of the auditorium.) Every time there is a respiration it is giving a signal down in the superintendent's office. That can be half a mile away, if you wish, or it will light a red light, or both. They have got to take care of the patient, for it will keep on ringing every minute until they do or every time it goes up to that point. If now there are twelve patients in the ward, this will record all these elements for any one patient for, say, five minutes, and then take the next patient's record for five minutes, and mark it down on a moving chart and at the same time mark the number of the bed opposite the record until it goes the rounds. So if there were twelve beds it would mark down the record for each one of those beds for five minutes of the hour, and then take the same series of beds the next hour, and so on. The nurse sitting in a side room can, at her will, keep it continually on one patient, or adjust it and take them all in series or as many beds as are occupied. You will readily see the possibilities for hospital work when means can be had for getting these records. Now, how is it connected to the patient? The device for making the contacts for the different beds is clearly shown. Fig. 7 shows the different attachments and their size compared to that of a dime. The element shown at the left is the heat recording instrument, and will record the temperature within one-tenth of one degree in the axilla. The essential part of the respiration recorder is shown at the top in Fig. 7. Let us assume that the axillary temperature is one or two degrees lower than that of the mouth. Variations on the part of the paient will so be recorded in the axilla. It probably will indicate all changes within one degree, though it may be one or two degrees lower than the exact temperature. It can be adjusted to read the temperature one or two degrees higher than the axillary temperature. Fig. 8, at the left, shows the temperature only. The center view shows the temperature and respiration and the one to the right all three. The lower instrument records the heart beats, and is so sensitive that a slight pulsation of the tissue is sufficient to make it respond. It doesn't matter whether the patient takes a large inspiration and then several short ones with the chest nearly inflated, or whether he has his capacity nearly exhausted and then takes several shorter breaths; it records them just the same. The tem-

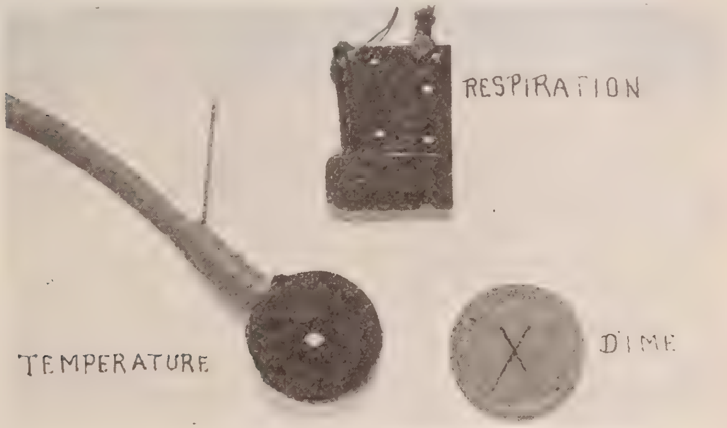


Fig. 7.

perature element can be used without using the others; in fact, I think it would often be so used. And the attachment is so simple that if the patient should wish to get up and leave the bed, a little contact pulls apart at the collar, and can be reattached when he goes back to bed. The mechanism is so designed that you may read any of the records directly on its scale or from the chart.

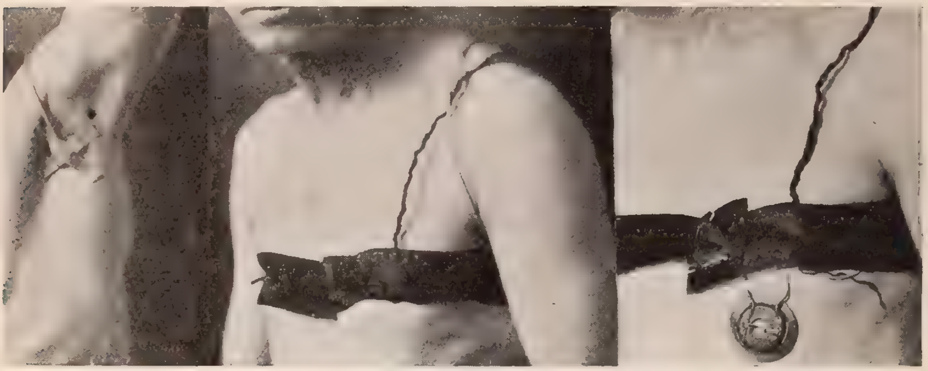


Fig. 8.

BABY FOODS AND ENAMEL HYPOPLASIAS.

I wish now to talk on a series of researches on the relation of baby foods to enamel hypoplasias. This is a deformity usually of the anterior teeth and first permanent molars. I first wish to show you a skiagraph (Fig. 9) of an infant, very young, to show that at the time, or even before it has gotten any of its deciduous teeth, the permanent teeth are visible, and their enamel tips are forming, and it is very certain that a disturbance of the nutrition and assimilation at that period may make its markings on the enamel that is being formed at that period.

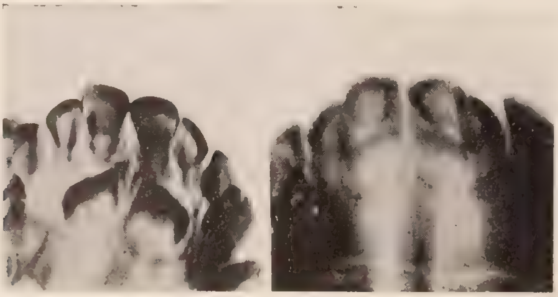


Fig. 9.

The next (Fig. 10) is a chart, showing the periods of calcification of the various teeth, and I simply put that on so that you will recognize and realize, if you have been watching it, that you may know by the markings on the teeth about at what time the nutrition changes took place.

I wish to speak of a few of the qualities of food stuffs, for you will readily appreciate that it will not do for me to speak of these by name, except in a general way. I don't want to have to go to Mexico. (See Fig. 11 from Holt). Let us take, for example, an analysis of these various foods. Nestle's food, for example, carries a fat of four per cent., a protein of 11 per cent., a cane sugar of 29 per cent., and following on down you will notice the carbohydrate of 51 per cent. Now if you will follow those food elements through the different makes, and take fat, for example, you will notice how they vary. In Nestle's, it is 4 per cent.; in Mellen's, food .2 of 1 per cent.; in malted milk, 8 per cent.; in Ridge's, 1 per cent; in Carnick's, 3 per cent. Now follow through the proteins, 11, 11, 5, 16, 11, 4, 14, 14 and 10. The soluble carbohydrates, 51, 80, 67, 67, 1, 1, 63, 27. Notice where these very low soluble carbohydrates come in. I may want to speak in a very general way about this, but I want you to notice some of the characteristics of the chart, because I cannot call the foods by name. Observe the insoluble carbohydrates, or starch, are: 27 per cent., 0, 21, 0, for malted milk; Ridge's food, 76 per cent.; Imperial granum, 73. I shall probably speak of those foods as lactated cereal or farinaceous foods, and malted milks, etc.

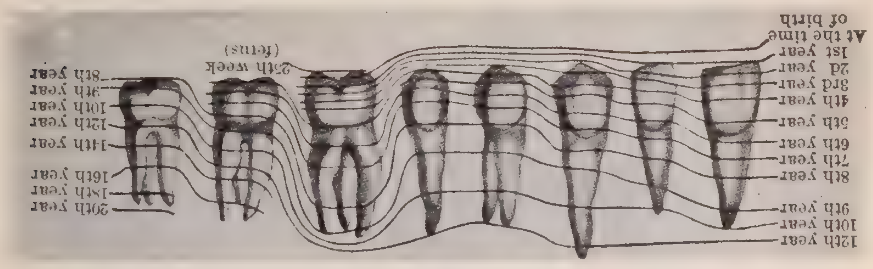


Fig. 10.

THE COMPOSITION OF INFANT FOODS.

	Nestle's food	Mellin's food	Eskay's food	Malted milk	Ridge's food	Imperial granum	Lacto-preparata	Carnick's food
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Fat	4·45	0·24	1·16	8·78	1·11	1·04	12·35	7·45
Proteids	11·47	11·50	5·82	16·35	11·81	14·00	14·51	10·25
Cane sugar	29·22	.....	...	....	....	.....	.....	..
Dextrins	6·22	19·20	14·35	18·80	1·28	1·38	...	..
Dextrose	15·95	.....	53·46	....	0·52	0·42	.....	....
Lactose (milk sugar)		.....		49·15	.....	.....	63·68	.....
Maltose	.....	60·80	.....		....	....	...	...
Total soluble carbohydrates	51·39	80·00	67·81	67·95	1·80	1·80	63·68	27·08
Insoluble carbohydrates (starch)	28·43	.....	21·21	.....	76·21	73·54	....	37·37
Inorganic salts	1·73	3·59	1·30	3·86	0·49	0·39	3·66	4·42
Moisture	2·53	4·73	2·70	3·06	8·58	9·23	5·80	3·42

Fig. 11.

Before studying the markings, I want you to study the chart, (Fig. 12 from Holt). Observe in mother's milk, at the top, what the normal amount of protein is. This protein is an animal protein and not a vegetable protein. Observe the normal fat in woman's milk, a food that does not carry very much of the so-called acid fats. Next observe the normal soluble carbohydrates, and next the insoluble salts with no insoluble carbohydrates. On comparing cow's milk you will notice a great increase of protein, a slight increase in fat, a diminution of soluble carbohydrate, and an increase in the insoluble salts.

If we were to make a chemical analysis of those foods we would find in the insoluble salts possibly a large per cent. of the tricalcic salts.

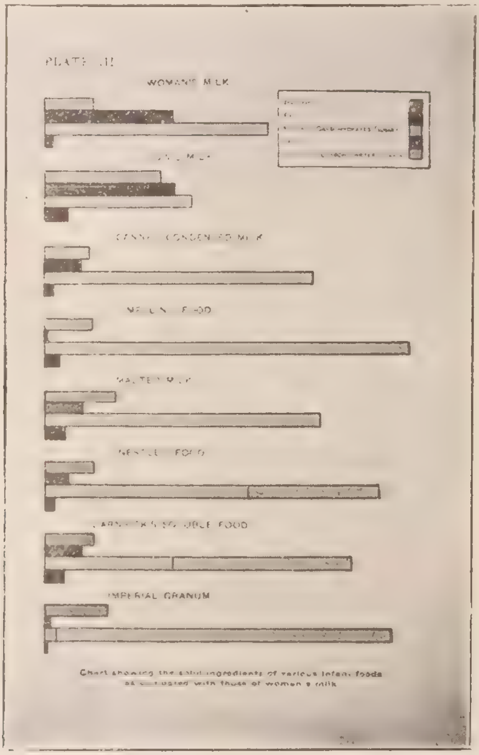


Fig. 12.

Note in condensed milk an increase of the protein, still an animal protein the fat is greatly reduced; the soluble carbohydrate is about the same as in mother's milk, and the insoluble salts about the same as in these other preparations.

You will notice that in canned condensed milk we probably have an animal protein. The fat is almost enough, as compared with mother's milk. The soluble carbohydrate is large; the mineral salts a little larger than in mother's milk. In Mellen's milk the fats are very low In malted milk the protein is a little more than in mother's milk; the fats are very much less, the soluble carbohydrates sufficient; and a larger amount of the insoluble salts. In Nestle's food there is almost no fat, the protein being sufficient. But we have, in addition to this soluble carbohydrate, an insoluble carbohydrate or starch shown to the right of the division dotted. The next, Carnrick's, is much the same. The insoluble carbohydrate or starch is very large. Imperial granum has plenty of a vegetable protein, if the vegetable protein would be adequate; almost no fat; just a slight amount of soluble carbohydrate, and a very large amount of insoluble carbohydrate or starch.

Fig. 13 is to show us the amount of calcification at two years. It shows the incisal cusps and part of the crown of the first permanent molar quite distinctly formed and the lower permanent incisor crowns about one-third formed. I wish you to differentiate and notice particularly the characteristic Hutchinson tooth, shown in Fig. 14. It lacks the central lobe and has a characteristic curve. You will observe that there are no teeth in the series that I will show that will approach this form. And in these years of collecting the models and histories I have not gotten half a dozen typical Hutchinson teeth, nor have I, in any of the cases that I shall show you, found a history of syphilis.

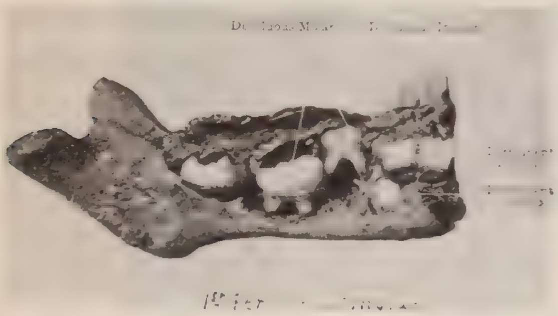


Fig. 13.

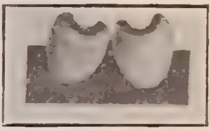


Fig. 14.

We will now study a series of typical cases from practice. (See Fig. 15).

(Miss H. M.) Brunette, age 20 years.

Extensive hypoplasia at about three years of age involving all incisors and first molars, probably due to whooping cough, not to feeding. This is shown for contrast with those that are to follow.

(Master P. R., Fig. 16). Blonde, age 10 years.

FEEDING HISTORY.

Scanty breast food for ten months and then a farinaceous food without milk until a full mixed diet. He did not like milk and so did not take it.

DENTAL PHENOMENA.

Hypoplasia of tips of central incisors. Four sisters' teeth normal and mother's normal in form but irregular, deciduous teeth are normal.

(Master J. L., Fig. 17). Blonde, age seven years.

FEEDING HISTORY.

Normal breast feeding until eight months and plenty then only on a farinaceous food which was high in insoluble carbohydrates and no animal protein for eight months or a year.

DENTAL PHENOMENA.

Hypoplasia of lower incisor tips and between the cusps on molars on occlusal surface. The teeth are abnormally sensitive. Two sisters' teeth normal and deciduous teeth normal.

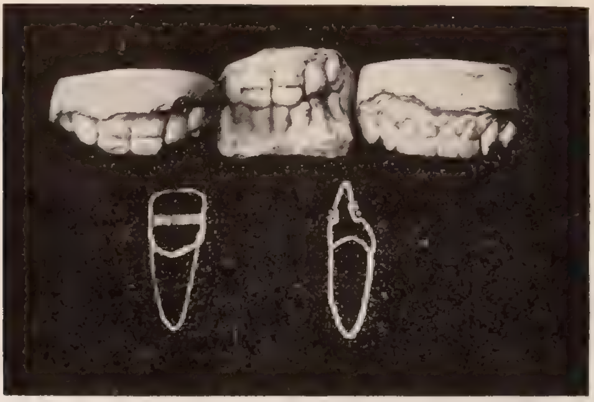


Fig. 15.

(Miss N. M., Fig. 18). Blonde, age eight years.

FEEDING HISTORY.

Breast food very scarce and abandoned at three months, followed by diluted cow's milk for two months until daily convulsions started and became severe, then a boiled malted milk. She did not try to walk until two years of age.

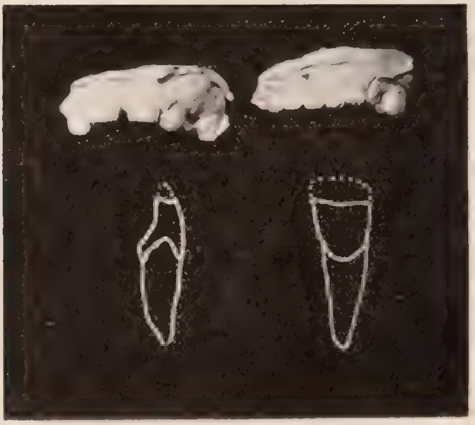


Fig. 16.

DENTAL PHENOMENA.

Extensive hypoplasia of all incisors and first molars with very sharp limiting angle or offset at margin of defect. Suddenly the incisors increased to three times their former diameter labio lingually, which is, apparently, their normal diameter. The enamel tips of the cusps of the first molars which were forming at birth stand like crowned pyramids. Note the normal lobing of lower incisors. The teeth are very abnormally sensitive. The deciduous teeth are normal. Both dentin and enamel are involved.

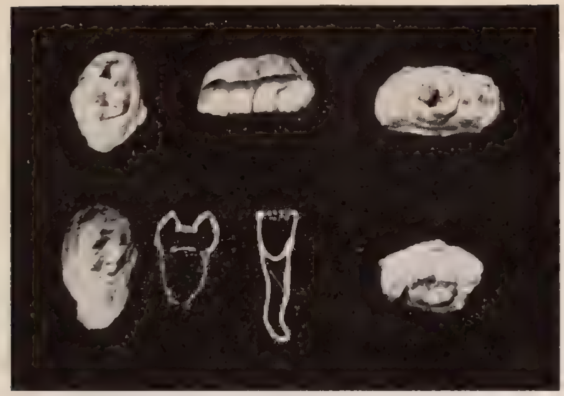


Fig. 17.

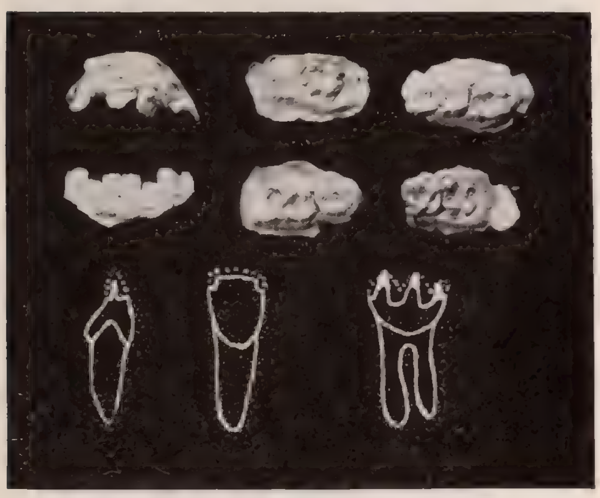


Fig. 18.

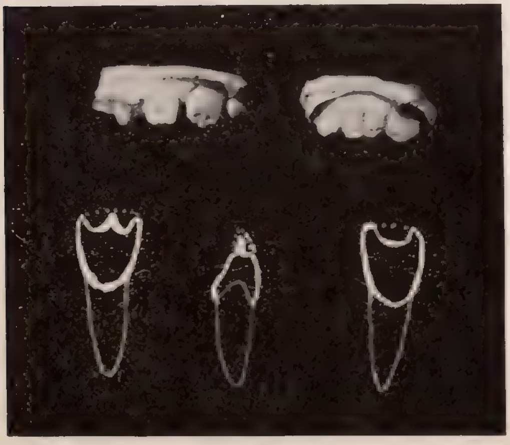


Fig. 19.

(Miss M. Z., Fig. 19). Brunette, age 10 years.

FEEDING HISTORY.

No breast feeding, used modified cow's milk very dilute and scarce by action of the nurse, who, it is said, poured two bottles daily in the sink. Child was poorly nourished. A baby food was later added to the milk and fed separately. It has not been analyzed but seems to be farinaceous.

DENTAL PHENOMENA

Extreme hypoplasia of tips of incisors and cusps of first molars with a rapid increasing of the diameter labio-lingually of incisors about end of first fourth of crown. The deformity of the two upper centrals is not uniform, the left approaching the Hutchinson type for which there is not found a supported history. Both parents' teeth normal in form, mother's have a tendency to decay. Brother has a similar history of feeding and similar condition. (See next case).

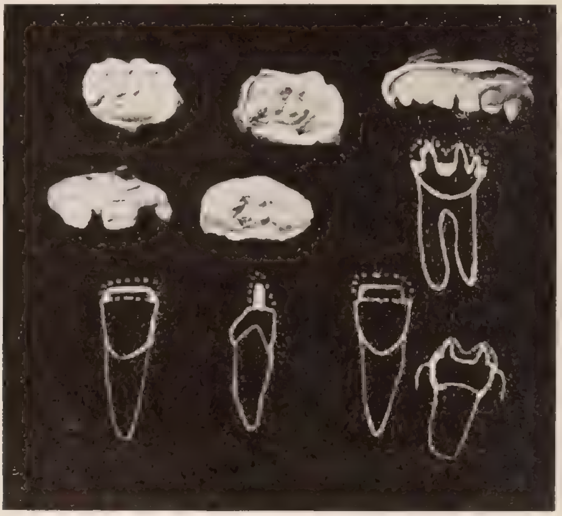


Fig. 20.

(Master J. Z., Fig. 20). Brunette, age seven years.

FEEDING HISTORY.

No breast feeding, started with modified cow's milk for few months but changed to some artificial baby food as his sister had, probably farinaceous, which was continued about two years when it was changed for a mixed diet. He got less cow's milk than his sister. (See previous case).

DENTAL PHENOMENA.

Has very marked hypoplasia of enamel of all teeth, forming at that period which ends very abruptly, producing a distinct step or offset on all sides of the teeth including all centrals, laterals and first molars. The enamel of the incisal edge of the lower incisors is better than below on the same teeth and the tips of the cusps of all the first permanent molars, which stand like pinnacles, are crowned with translucent, strong enamel. Note particularly the regularity of the hypoplasia on all teeth forming at that time, also, that he had less cow's milk than his sister at the latter part of the period and, also, a more extended hypoplasia. The mother acknowledged a fear that she had not done her full duty in not nursing her children by asking why mothers had not been warned that baby foods were not a satisfactory substitute. She revealed a guilty conscience by asking the above after having emphatically stated that artificial foods were not used for the boy and then made a complete confession stating that she had not wanted to be restricted and have them dependent upon her always being available, etc.

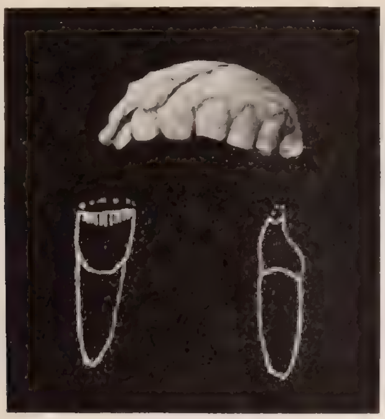


Fig. 21.

(Master H. B., Fig. 21). Blonde, age about 20 years. Healthy and full stature.

FEEDING HISTORY.

Breast food for six months, limited supply, then a farinaceous artificial food with limited breast food for three months, then a condensed milk until a mixed diet was substituted, which agreed better than the farinaceous. Delicate baby until eighteen months and frail until three years. (Eight-month baby). Sister's teeth normal.

DENTAL PHENOMENA.

Marked hypoplasia of the upper central incisor tips and of lower central and lateral incisors and of occlusal surfaces including the cusps of the first molars.

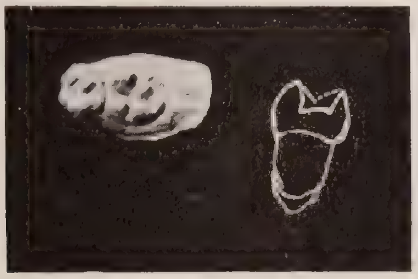


Fig. 22.

(Master W. N., Fig. 22). Blonde, age 12 years. In good health.

FEEDING HISTORY.

Natural food for nine months and never would take cow's milk. Was fed entirely on farinaceous artificial foods, with cocoa for milk, but no milk because he did not like it.

DENTAL PHENOMENA.

All first molars are very defective on their occlusal surface, though the tips of the cusps are well formed.

(Miss F. S., Fig. 23). Blonde, age 25 years. Good health.

FEEDING HISTORY.

Breast fed, scanty quantity for three months, then a farinaceous artificial food, cooked in water, for a year and a half, but started some mixed diet with it at about a year. She cried most all the time for one and a half years, except during the months of breast feeding. Finally the farinaceous food was abandoned for a mixed diet because they saw it was not nourishing her. She did not like cow's milk.

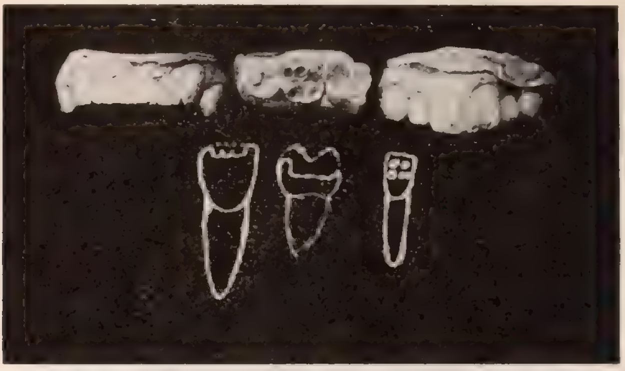


Fig. 23.

DENTAL PHENOMENA.

A deep hypoplasia of the incisal edges of the upper central incisors and lower incisors and of the entire occlusal surface of each of the first permanent molars. Note, including all the cusps which broke away soon after eruption. Teeth very sensitive. Deciduous teeth normal. Sister's teeth excellent.

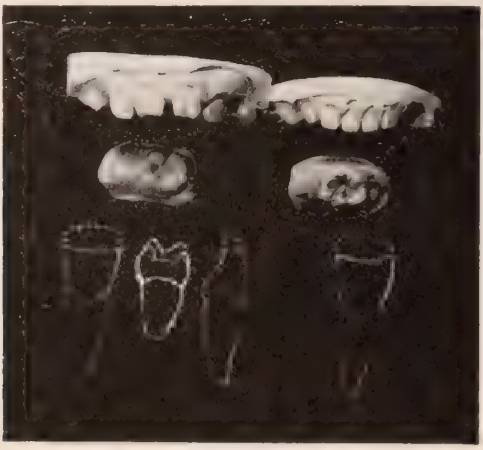


Fig. 24.

(Miss I. Mc., Fig. 24). Blonde, age about eight years.

FEEDING HISTORY.

From birth to six months no breast feed, but fed on a farinaceous artificial food. From then to three years of age a sterilized milk, with fruits and common foods in latter part of period. Up to two years her health was poor, owing, as mother said, to bad blood. The child is now splendidly nourished. Deciduous teeth were perfectly normal.

DENTAL PHENOMENA.

A distinct hypoplasia of the upper central incisors and tips of laterals and lower centrals, lateral and cuspids. The molars show a distinct depression on the occlusal surface with lack of deposition of the enamel as shown in diagram and photographs. The upper central incisors look very much as though they had been cut squarely off.

(Master P. D., Fig. 25). Age 10 years.

FEEDING HISTORY.

No normal breast feeding. Was given a lactated artificial and milk from birth until put on a full mixed diet of solid food. Milk began with small amounts and was increased with age. At present well nourished and normal.

DENTAL PHENOMENA.

Very marked hypoplasia of the enamel, persisting for about one-third of the length of the lower incisors, then quite rapidly tapering to a normal contour. The incisal third of the lower centrals is only about the thickness of twice that of a postal card, and the laterals three times that of a postal card. All first molars have cusps standing as pinnacles where they have not been broken off and the contour greatly deficient.

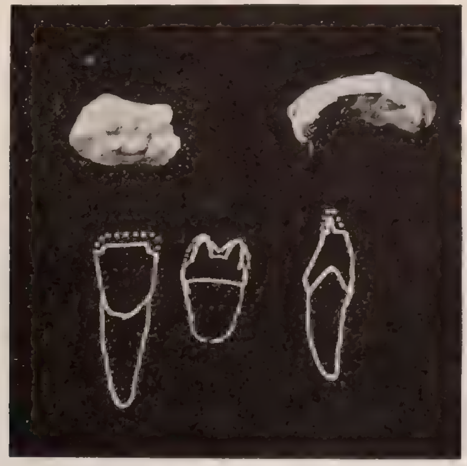


Fig. 25.

(Master H. C., Fig. 26). Blonde, age 12 years.

FEEDING HISTORY.

No normal breast feeding but raised on a farinaceous artificial food until put on a mixed diet. Was so fat and plump a baby that his parents were urged to enter him in a baby show. Did not walk until later than normal.

DENTAL PHENOMENA.

A very marked hypoplasia of the occlusal surface of all the molars and of the incisal edges of the lower incisors and slight cupping of the incisal edge of the upper incisors.

(Miss M. C., Fig. 27). Blonde, age nine years.

FEEDING HISTORY.

Limited breast feeding for three months, then put on modified milk.

DENTAL PHENOMENA.

Has two sisters and one brother, one sister has slight hypoplasia, the other sister and brother very normal perfect teeth. Father's and mother's teeth normal except that the father's shew a line corresponding with a severe illness at three years of age. This girl's teeth show very marked hypoplasia of all incisors, upper and lower, and of all first molars. The contour of all first molars deficient, though tips of the cusps are well formed.

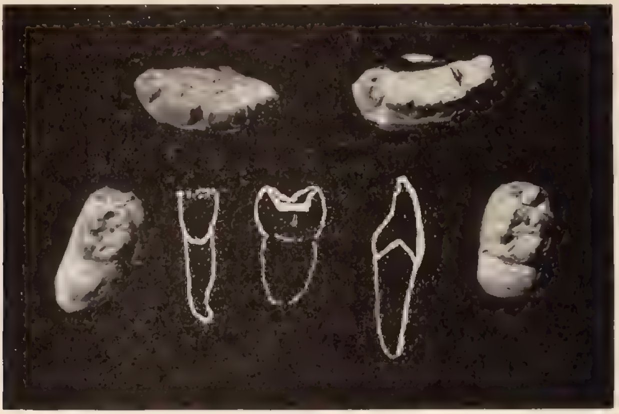


Fig. 26.

(Mrs. S., Fig. 28). Brunette, age 65 years.

FEEDING HISTORY.

Was told by her mother that there was insufficient food for breast feeding and various substitutes were experimented with and finally a wet nurse was secured.

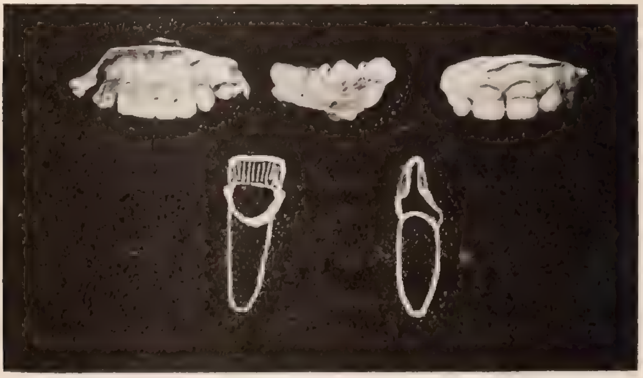


Fig. 27.

DENTAL PHENOMENA.

All first molars are lost and all but two upper incisors, which, with the lower incisors, show distinct hypoplasia involving the first third.

(Mrs. D. C. M., Fig. 29). Brunette, age 35 years.

FEEDING HISTORY.

No history of feeding but had a severe illness, thought to be inflammation of the lining of the stomach.

DENTAL PHENOMENA.

All incisors and molars show distinct hypoplasia, taking the form of restricted diameter for the incisal half of the lower centrals and laterals. All first molars have characteristic pinnacle-shaped cusps with lack of contour, including first half of the molar crown. These teeth have always been hypersensitive.

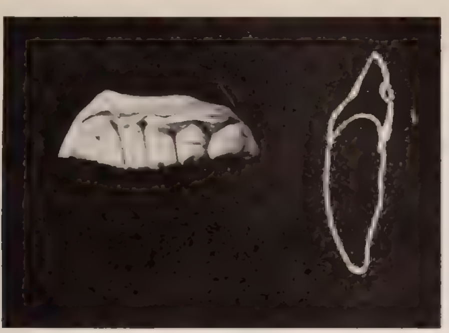


Fig. 28.

(Mrs. J. P., Fig. 30). Brunette, age 49 years plus.

FEEDING HISTORY.

Remembers that her mother told her that she was raised on malted milk.

DENTAL PHENOMENA.

All first molars are gone. The lower incisors have a marked hypoplasia involving the first fourth producing the offset screw-driver appearance. The upper central tips have a cavity depression not from decay in the incisal edge. The line of demarcation between the defective and normal tooth structure and contour is very closely marked.

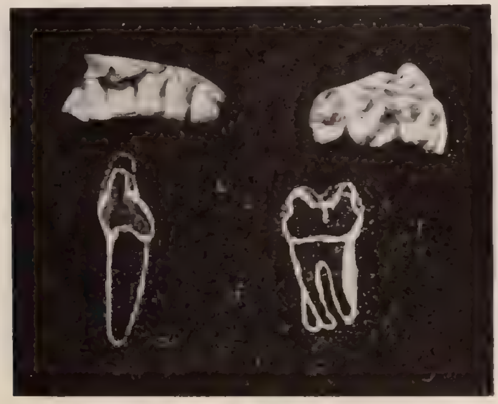


Fig. 29.

(Miss E. P., Fig. 31). Blonde, age eight years.

FEEDING HISTORY.

Normal breast food for ten months, but her father died suddenly when she was six weeks old, leaving her mother a nervous wreck and forced to earn. After the shock Ella did not grow or show fair nourishment. At ten months was placed on diet of cereals and milk. A history of stomatitis between two to four years. Present health good.

DENTAL PHENOMENA.

Ella presented unilateral hypoplasia of the right first molar, right central and right lateral. Note that this hypoplasia is entirely unlike those presented in the previous cases but involves a part of one surface only of each of the teeth named.

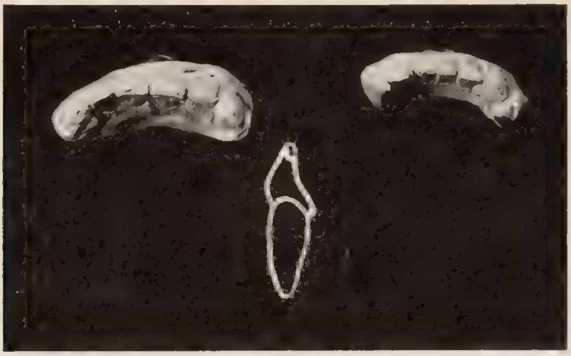


Fig. 30.

(Twins—Masters M. B. and M. B.). Blonde, age seven years.

FEEDING HISTORY.

Myron was the weaker of the two. He was nursed thirteen months and Malcolm was nursed eleven months. Both were always hungry and it was recognized that there was insufficient for both. There are two other children both having normal teeth and the parents have normal teeth. All are very healthy.

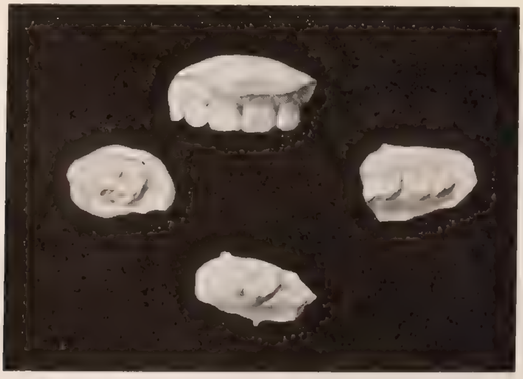


Fig. 31.

DENTAL PHENOMENA.

With both boys the lower incisors show a marked hypoplasia entirely unlike all presented heretofore. The structure and surface of the enamel seems normal throughout but the teeth are slightly lacking in contour for the first third, producing a slight tapering, resembling a taper screw-driver. It is interesting to note that this characteristic deformity is worse for the boy that was weaned first.

(Master K. P.). Blonde, age 10 years.

FEEDING HISTORY.

Normal breast feeding for first year then milk and bread and milk diet, and some solid food. Was well nourished during first year but from second to sixth year was troubled with a constantly increasing affliction which he called the "Chokes." He was ravenously hungry but his food would keep regurgitating, involuntarily, many times during a meal. Finally the writer put a solution of bismuth subnitrate in his stomach and made an X-ray and found that a very small part of it had gone into the stomach and that the esophagus was bulged into a pouch larger than the normal stomach and that there was a constriction at the cardiac end of the stomach at its juncture of the esophagus. The condition was rapidly getting worse and after much consultation, he was taken to Rochester, Minnesota, to the Mayo's for operation, which was accomplished by difficult, gradual dilatation with the result that in a few months he was able to swallow and retain full mixed diet.

DENTAL PHENOMENA.

The structure and contour of the enamel is apparently normal except in the extreme susceptibility to caries, which spread with unusual rapidity after getting through the enamel to the dentin. The dentin is very abnormally sensitive and a very shallow cavity in each a central and molar exposed the pulp. The skiagraph shows the pulp chambers of all the incisors to be abnormally large, indicating a disturbance, if not an interruption, in the deposition of the dentin.

(Mrs. S.) Age 70 plus.

FEEDING HISTORY.

Was one of a pair of twins, she, the stronger of the two, was weaned to leave a normal breast food for her brother while she was fed on rice and gruel.

DENTAL PHENOMENA.

The lower incisors show a marked hypoplasia of the incisal third of centrals and laterals, and involving the tips of the lower cuspids.

(Mr. B.) Brunette, age 33 years.

FEEDING HISTORY.

Probably little or no breast food, was not able to take milk or eggs until twelve years of age. Was fed during the early childhood on scraped raw meat.

DENTAL PHENOMENA.

Hypoplasia of the cuspids, centrals and laterals, involving about three to three and one-half years of growth. The enamel is more perfect on the first fourth of upper centrals than on second fourth, ditto lower centrals and laterals.

Review of the preceding twenty-one cases, and about an equal number which would be duplicates, forcibly brings out the following information.

First. While an enamel hypoplasia of the incisors is a marking that would be carried for life, it is not nearly so common in the people available for the writer's examination among those passed sixty as those under twenty, the ratio being nearly seven to one.

Second. All cases have been counted whether the history could be obtained or not and in almost every case of enamel hypoplasia coming under the writer's observation where the history could be secured, there was not a normal diet during the first one or two years of life.

Third. None of the cases here presented are the typical Hutchinson syphilitic teeth shown in Fig. 14.

Fourth. A study of the laws of human assimilation and metabolism and the result of experiments on rabbits, guinea pigs and white rabbits made by the writer and by others has shown that the nutrition and growth of the young life is dependent on an available source of calcium compounds, for the animals fed by the writer on a calcium-free diet failed so rapidly in health that the diet had to be abandoned in every case to prevent the death of the animals and in one instance to prevent the animals from eating each other.

Fifth. Infant human beings cannot obtain lime salts from the same sources that most animals can, for example rabbits and guinea pigs can obtain it from lettuce and green herbs the first day after birth, calves from grass from six weeks to a few months after birth, adult rabbits can even obtain it from calcium carbonate. Investigations indicate that the human infants can only obtain it from animal protein for several months after birth and later can obtain it from vegetable protein and soluble carbohydrates and probably much later from insoluble carbohydrates.

Sixth. The human infant for several years of its life cannot obtain calcium from inorganic compounds and even human adults can obtain very little from that source.

Seventh. A comparative study of the deposition of enamel in the various stages of its development in the various teeth and its relation to the age at the time of the changes in the feeding shows in the cases just recorded in detail a very positive harmony. See illustration (Fig. 10) indicating the period of calcification for the various teeth, also X-ray pictures of infant's teeth. (See Fig. 9). The published chart of the period of enamel calcification is of the upper teeth, the lowers calcifying from six months to a year earlier for the same stages and the lower cuspids two or three years earlier than the uppers. The writer's observation is that the calcification period, as indicated in most of the calcification charts, is given from three to six months too late as the average as shown by many of the skiagraphs.

Eighth. A study of the baby food substitutes indicates quite strongly that many, if not most or all of them, are far from being competent substitutes for the normal food.

Ninth. Both clinical and research data strongly indicate that even normal cow's milk does not furnish the calcium compounds in the form in which they are most readily assimilated by infants.

Tenth. The processes of modifying cow's milk entirely fails to make it a competent substitute for mother's milk, though probably the best now available.

Eleventh. The chemistry of the assimilation of calcium compounds is not perfectly enough worked out to answer the question as to how to modify artificial substitutes.

Twelfth. It is very clearly the duty and privilege of the dental profession to help to open this door and give to humanity a means for, in a large part, correcting this great and apparently rapidly increasing affliction of dental hypoplasia.

Of all the patients that have come under my observation while making these studies, covering several years, of those under thirty years of age, I find that about one in seventy-five has an enamel hypoplasia; of those between thirty and sixty, about one in two hundred, and of those over sixty, about one in five hundred. There is more than a suggestion that the increased use of baby foods is responsible for the increased frequency of this very serious deformity, a deficiency of the enamel structure. If these people died the significance is even greater for it would be in accordance with the researches made by the Swiss government upon the relative strength, endurance and resistance of their soldiers, whether fed as infants on normal breast food or on artificial substitutes.

PLASTICITY OF FACIAL BONES.

We will now go to a study of the relation of the dentist to the plasticity of the bones of the human race. When in Paris in 1900 Dr. Michaels showed a man for whom he had made an artificial shoulder joint of silver and hard rubber placed within the periosteum, and new bone was caused to grow around them. and in time the man had an entirely new shoulder joint. I remember he showed us pictures of that man carrying a pail of water with that arm and new shoulder. That gave me a vision that the bones of the face have perhaps a great deal more plasticity and mobility than we had ever supposed they had, or at least than I had supposed they had. And these researches are studies along that line. The first case is that of a lady who had the misfortune to have a septic infection enter her chin. It increased in severity, involving at first only the soft tissue, until finally it involved the hard tissues as well, and until she had lost all the mandible back to the second molar on one side and third molar on the other, and all of the teeth. When she came to me those angles had moved in, and the remnant of the periosteum had made a tie of bone about three-quarters of an inch long, uniting those ascending rami so closely under her tongue that she could swallow only liquids easily, and was in great fear that the thickening and enlarging of that bone which was continuing would eventually cause serious distress. She was so deformed, or thought she was, that when she was brought to the office she was not only heavily veiled, but inside of the veil had large surgical bandages. (See Fig. 32, which is a photo of a plaster cast of her face). The operation was to stretch the little bit of new bone, as shown in the next picture. (See Fig. 33C). You will notice how the chin is very seriously depressed and there is a very serious deformity of the angle. The chin proper was about one inch back of the tip of the upper incisors. (See Fig. 33E). We undertook to stretch this little bit of new bone to make an arch. In brief, we succeeded in nine months in moving the angles

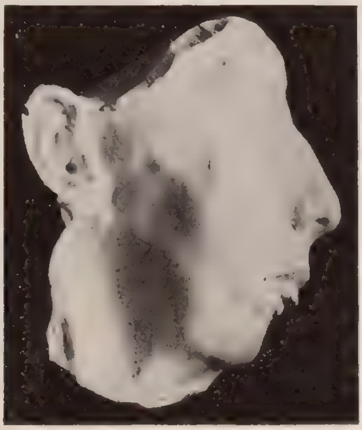


Fig. 32.

laterally and the chin forward with an appliance that kept continual pressure at those points, and in that manner enlarged the arch until it had a width that would about go over the former arch and in relation to

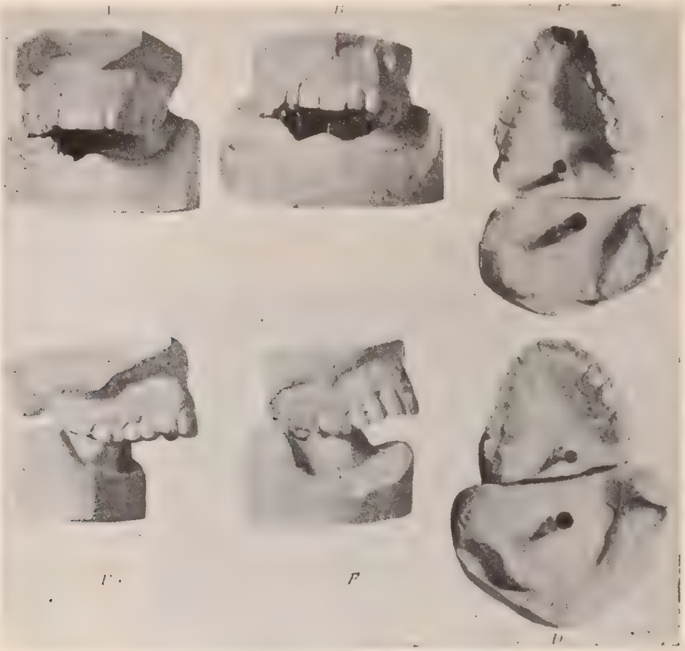


Fig. 33.

the upper incisors moved forward, as shown in the illustration, nearly to the line of the upper incisors. (Fig. 33F). Now the next picture will show us a little of the change, (see Fig. 33D), this being a comparison of the two arches without showing the appliance in place, in which there is a jackscrew in the soft vulcanized velum rubber. Pressure was made inside

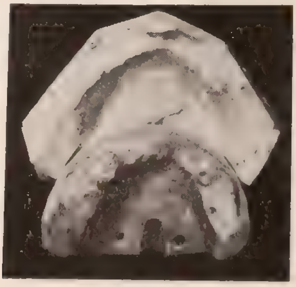


Fig. 34.

of the lateral walls of the remnant of the angles, thus moving them sidewise, until we had sufficient width for her to swallow and eat coarse food with comfort. Pressure was made forward inside of the lower lip, tending to drag the symphesis to its normal position. Fig. 33D shows nine months' change which since has been much increased, as shown in Fig 34, which is the change in two years. The next (Fig. 35) shows her appearance later, and if you were to meet her on the street today, you wouldn't find her veiled, and I think you would never suspect that she had ever had an accident. (Applause). She is very comfortable, and very grateful.

I want to say to you that the compensation from a financial standpoint is no consideration in undertaking to help these unfortunates, for they are discouraged, their life is crushed, and we cannot possibly do too much or make too great sacrifices for them.

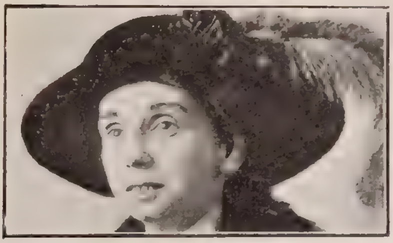
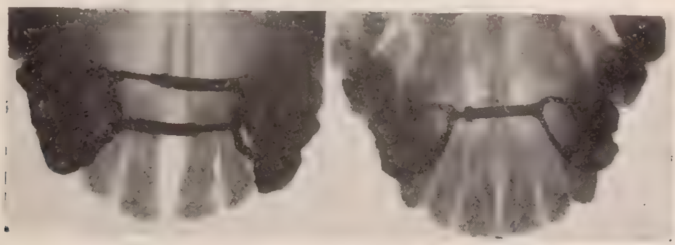


Fig. 35

The next will show another series of studies on the flexibility of bones, and I wish to differentiate very closely between a movement of the teeth in the bones and the movement of the bones themselves. All I wish to demonstrate in this case is the bending of the mandible, without moving the teeth in the mandible. What I want to undertake to show is that the mandible can be bent without changing the position of the teeth much in the mandible. First, I want to speak on the relation of the ventilation to the health of this boy. He could not breathe sufficiently to play ball. The nasal openings, external and internal, are so small that he was greatly fatigued upon slight exertion, and that necessitated the moving of the maxillary bones laterally apart, which brings up the question as to whether or not this really can be done. In this skiagraph, (to the right in Fig. 36A), shown above, you see the position of the central inciscrs. The appliance was expected to move them apart, though it was not attached to them. If anybody has any doubt as to whether or not this question is disputed they have only to inquire and they will find that the members of our profession are divided into two great camps—those of one camp saying positively that it cannot be done, and those of the other saying, "Why, of course, it can be done." When these bones had been


B Fig. 36 A

moved, as shown, and when these centrals and laterals, which were not in any way connected to the appliance, had separated, we made a series of tests to find whether or not it was simply the pre-maxillary bones, as some claim, or the maxillary and palate bones complete, that were moved. In order to prove it we put an injection of novocaine in the hard palate, and had four reliable dentists present, Drs. Yahres, Walker, Moffet and McCauley—and I think most of them, if not all of them, are here—and passed an instrument through the separation, half an inch at least, up in between those plate bones, just forward of where the hard palate joins the soft palate, establishing the fact of maxillary separation, so far as that patient is concerned, though the skiagraph to the left in Fig. 36B clearly shows the suture open beyond the line of the first molars. Unfortunately, it is a difficult thing to take a skiagraph that does not exaggerate, or that does always tell the truth; for, as the men who would discuss this picture could justly say, we could easily get a projection and a curving of the incisor teeth here to such a position that it would look as though the fissure ran back the entire length of the maxillary bones, when it did not. It is very necessary to know the angle of incidence and relation of film or plate to the parts. Now, a study of the head skiagraphs in this case (Fig. 37 at right) will show us that a line drawn from the forehead to the chin will nearly touch the incisors of the lower jaw. This case is only to be reported in part at this time as it is still in progress. We here simply wish to illustrate that the mandible was bent at the point of the extraction of the first bicuspids where we were required to reduce a maxillary and mandibulary anthropoid deformity resembling the apes. The small skiagraph on the large one shows a V-shaped section cut out of the lingual and buccal plates of the mandible and this same space is practically closed in the large skiagraph to the left. If you will note the relative position of the line drawn from the forehead, it is a full half inch forward of the lower incisors after the bending operation was accomplished in about three weeks, while before it almost touches

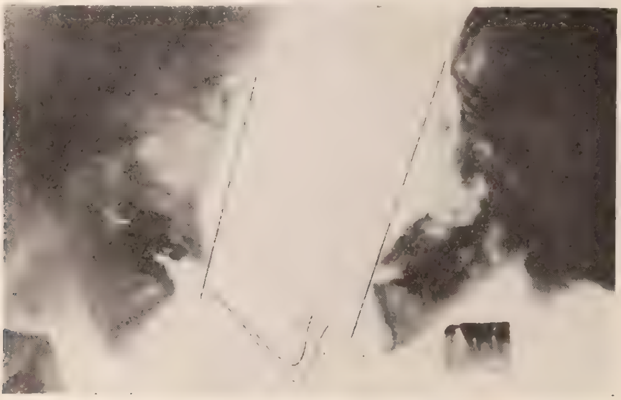


Fig. 37

them, and you will notice that the curve of the mandible is changed at the point where it was weakened. The curves of the lower border are reproduced graphically for comparison. The next operation then will be the bending of the bone of the upper in the same manner. This is being done at this time, and will be reported later in detail.

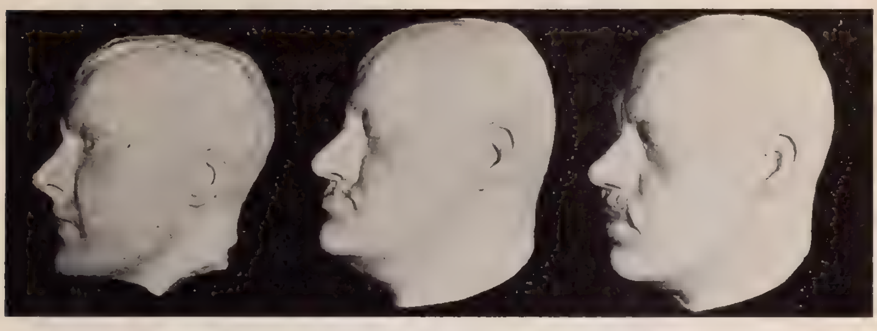


Fig. 38.

BLOODLESS DECOMPRESSION OF THE CELLA TURSICA.

I wish now to speak of the relation of the hypophysis cerebri of the brain, or the pituitary body, to some of the dental deformities, and the counter relation of dental deformity to the functioning of the pituitary. I first want to present a case that was in my care a few years ago, being a sufferer from acromegaly. These cuts are from plaster casts. (See Fig. 38). The first at thirty-three years of age, before the attack, and the others at forty-four. This is another phase of functional disturbances of the pituitary body, one where there is probably an overactivity of the anterior lobe, causing an abnormal skeletal growth with an enlargement of special bones and tissues, including the mandible. The last to the right shows my feeble efforts to improve this case by putting in

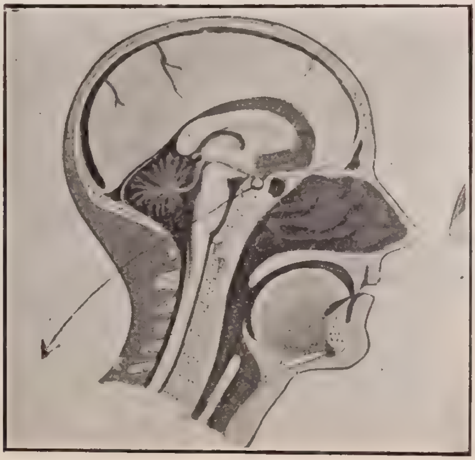


Fig. 39.

an artificial denture carrying an extra set of teeth outside his own teeth, and thereby carry the lip forward besides giving him a masticating surface. Finally the mandible moved forward until it was a full inch anterior to the upper teeth. What I did did not influence the progress of the disease at all, although it gave him temporary comfort.

Now, I wish to present a case that I have treated in an entirely different way. It is of a boy about fifteen and a half years of age. First, I want to show you the relation of the pituitary body or hypophysis cerebra to the bones of the face. It lies in what is called the sella tursica, in the base of the brain, in the sphenoid bone, (see Figs. 39 and 40), and is so well protected that nature must have intended that it should have great responsibility. The ancients said it was the seat of the soul. We do know that it seems to have a very large influence in determining, not only calcium deposition, but also in determining such functions as the carbohydrate assimilation, and I am glad to have learned, while coming over from the hotel, that Dr. Kirk has just been to Toronto presenting some work on its relation to caries. To me the interesting thing in the history of this case is the very marked change in his mental as well as physical condition. I wish to speak more in detail of the pituitary body. It has two lobes. The anterior lobe gives its secretion directly into the circulation, and the posterior lobe into the cerebro spinal fluid through the third ventricle. It is below the dura mater which separates it from the brain and enclosed in the dural capsule. If there is an inflammatory disturbance, involving the dura at this point, you can readily see that it may involve the infundibulum, or neck, which, passing through the dura, unites the pituitary with the brain. This boy had cerebro spinal meningitis when three or four years of age, and we find, as he appears now, that he has many of the points of development of a boy three to six years of age.

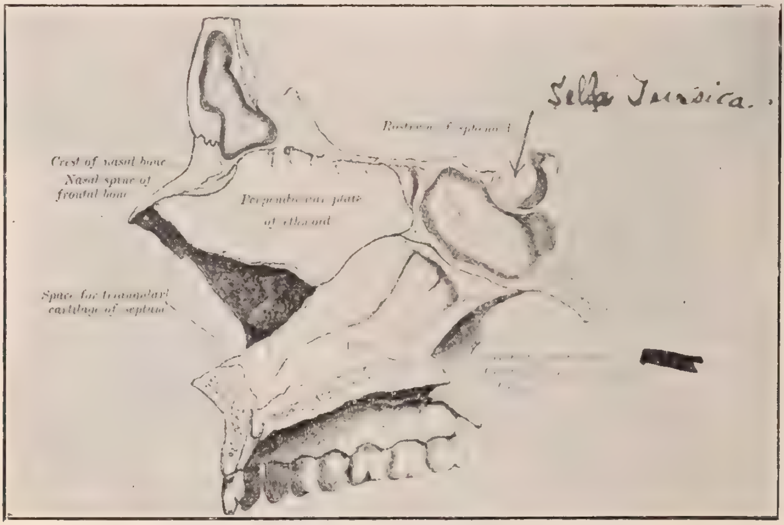

Sella Tursica.
Rostrum of sphenoid
Crest of nasal bone
Nasal spine of frontal bone
Perpendicular plate of ethmoid
Space for triangular cartilage of septum

Fig. 40.

It is quite certain that there is a deficiency in the functioning of that gland. There have been a great many studies made recently on that point with animals, chiefly by Cushing. Fig. 41 shows the boy as a baby and several views as we saw him in the various expressions of countenance when he came to us six months ago. He had the development of a child in many ways. He played with toys and with children. He was as infantile in the development of his reproductive organs as at six years of age. This is characteristic of cases where there has been an interference with the functioning of this organ when the anterior lobe is involved. He was always hungry; he was always asking for a drink, and he was sleepy; his temperature was subnormal; and he had many of the characteristics that are known to be very definitely and positively present in the case of pituitary disturbance. He had blind areas in both eyes.

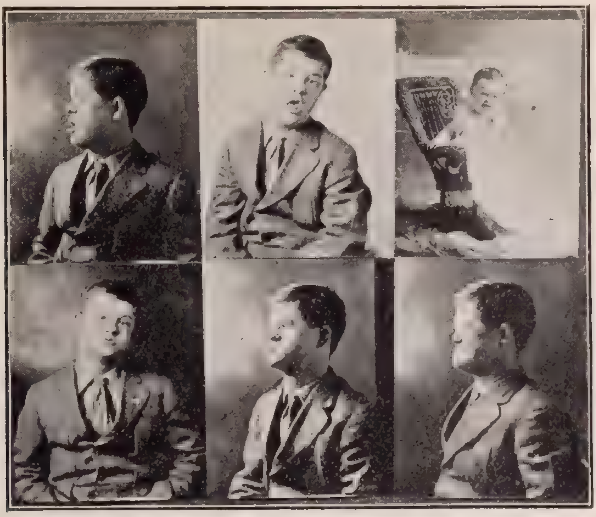


Fig. 41.

Fig. 42

We will now observe some studies of dogs that were made by Drs. Cushing, Goetsch and Jacobson. They found when they removed part of the hypophysis that the dogs did not develop normally. They were undersize; they remained infantile, as far as their development was concerned, particularly the reproductive organs. They found they were stupid, sometimes really silly, in their development. They show dogs that are old enough to be perfectly developed, and yet the reproductive organs are infantile. Their whole development is pup-like, and carries with it in brief all of those infantile characteristics. Fig. 42 shows two operated dogs and their brother and sister as checks. Dr. Cushing, of Boston, has operated on many persons for the relief of pituitary pressure as have also a few others. They usually lower the floor of the cella to allow of its development downward and thus find relief from the pressure such as a brain tumor near it. This operation usually is to go through the mouth and remove a part of the sphenoid and the floor under the pituitary body or through the temple. You will note the relation of the pituitary body to the optic nerves and will readily see why a pressure in or about that pituitary body may be conveyed to those nerves and thus produce a bilateral disturbance of vision. There is a lack of development of the

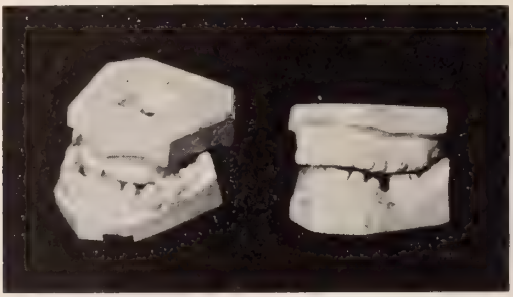


Fig. 43.

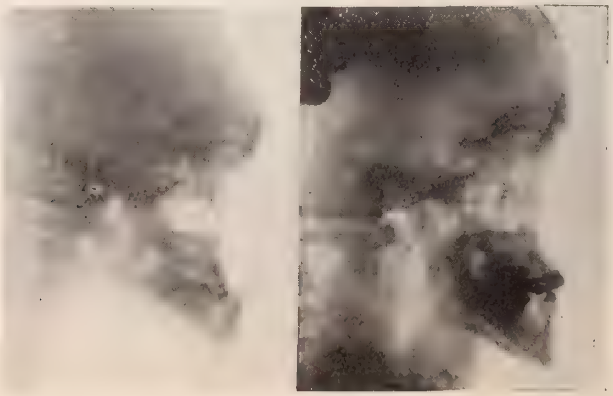


Fig. 44.

bones of Warren's hand and you can bend the fingers backward as though they were a bunch of soft rags. They are lacking entirely in that resiliency, solidity and stiffness that a boy of that age should have. The teeth of the upper arch did go entirely inside of the teeth in the lower arch, but with a lateral wedging pressure, and you can imagine what a deformity that would make, and what a deficiency in his eating. (See Fig. 43). If I had time I would show motion pictures of him, before and after, which were used as part of his record. The only way he could eat was by filling his mouth so full that he could crush it between his tongue and his cheeks. He had nearly a perfectly developed upper arch, but it was that of a boy four or five years of age, with a lower arch of a boy fifteen or sixteen. Studying his head with the X-ray, we find that the relation of the upper arch to the lower arch is shown to be very far distally, (see Fig. 44 at left), and the maxillary bones are very much underdeveloped. I want you to notice later the change in the relation of the sella tursica and maxillary bones after the operation, of which I will speak. Now, have in mind, please, when studying the maxillary bones, that the sella tursica has its positive connection with them through the solid bony tissue. And when we move the maxillary bones down and forward, we modify the pressure and support of the entire central base

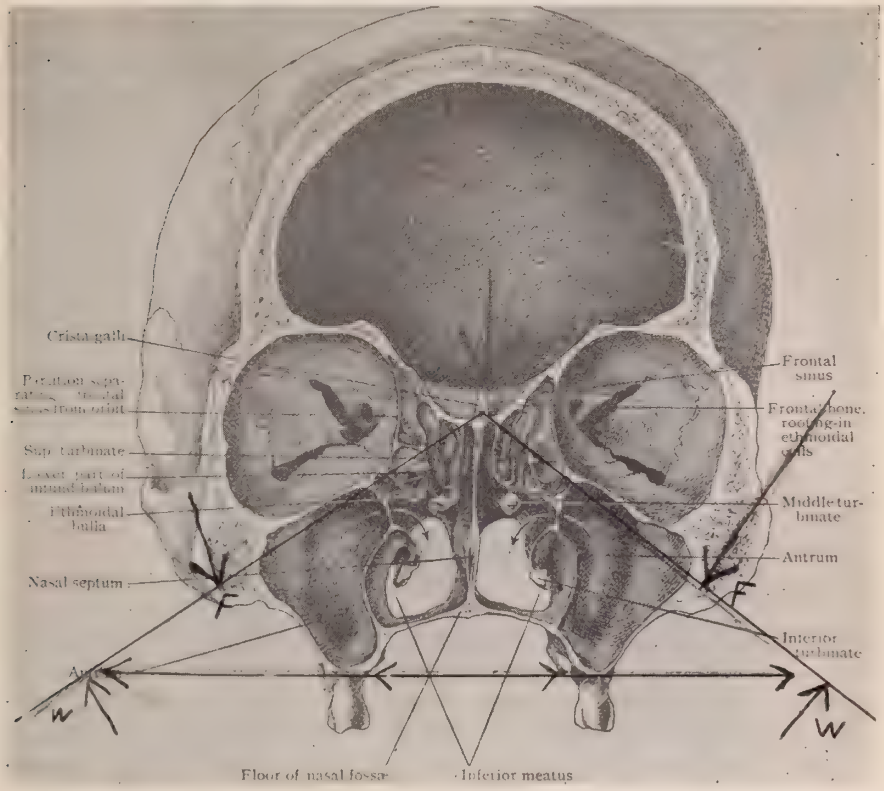


Fig. 45.

of the brain. Fig. 45 is a cross section through the eyes and the mouth, and I want you to notice the definite relation of the base of the brain to these bones. If now we move the maxillary bones laterally, we will necessarily widen the nares. (See Fig. 46). When we started with this boy his left nostril was entirely closed, and a rhinologist spent half an hour with adrenalin and cocain endeavoring to get water or air through it and could not. After the appliance was put on to carry these bones laterally, within three days the boy could begin to breathe through that nostril, and if I hadn't forgotten to bring it, I would show you a model of the nostril, and you could drop a slate pencil or a flattened lead pencil through the opening, so large has it been opened. Now, if we apply force between the teeth of the maxillary bones and cause an outward pressure, they meet a resistance in the attachment of the maxilla with the malar bones. (See Fig. 45.) We then have two forces drawing the sphenoid and cella downward, viz., the fulcrum over the malar and one like the flattening of a hoop. These are shown in Fig. 45. There are several other effects of these forces.

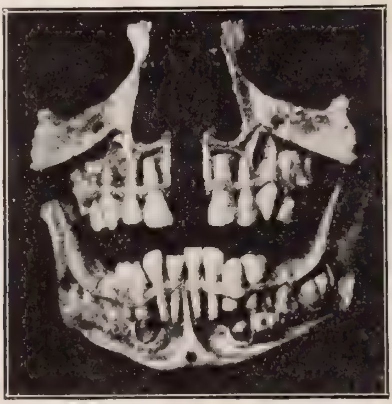


Fig. 46.

We will now study the skiagraphs showing the changes in the maxillary relations. No. 1 in Fig. 47 is the condition on May 3, 1913. You will see that the central incisors are in contact. The next, May 10, shows suture opening and rapidly, as shown on May 13th, 19th, 27th, June 4th.

On May 27th he had improved so much that he could do away with the pillow that had been rolled up, or a coat or something of that kind, that had to be put under his neck, as otherwise he would become suffocated from the involuntary closing of his mouth in his sleep. He did away with all that special padding without which he could not sleep before and was breathing through his left nostril, through which he had apparently not breathed for many years. The changes that you see physically were not greater than the changes mentally, of which we shall speak a little later. The movement was discontinued during the hot summer months and he returned to his home town. In the fall we renewed our pressure, carrying these bones still further apart until we had the central incisors as you will see here, by October 1st, five-eighths of an inch apart. We then put in two extra central incisors between his own central incisors, see Fig. 48, supported as part of the fixed retainer, and the relation of the maxillary bones to the mandible was carried forward by inter-maxillary stress, with proper anchorages on each the lower teeth and the upper teeth, and elastic force operating forward on the uppers and backward on the lowers, and the mandible being quite fixed as it pressed against the outside skull resisted the elastics which were pulling all the time forward on the maxillary bones, and we were certainly also moving the base of the skull downward, as you will see. We have thus

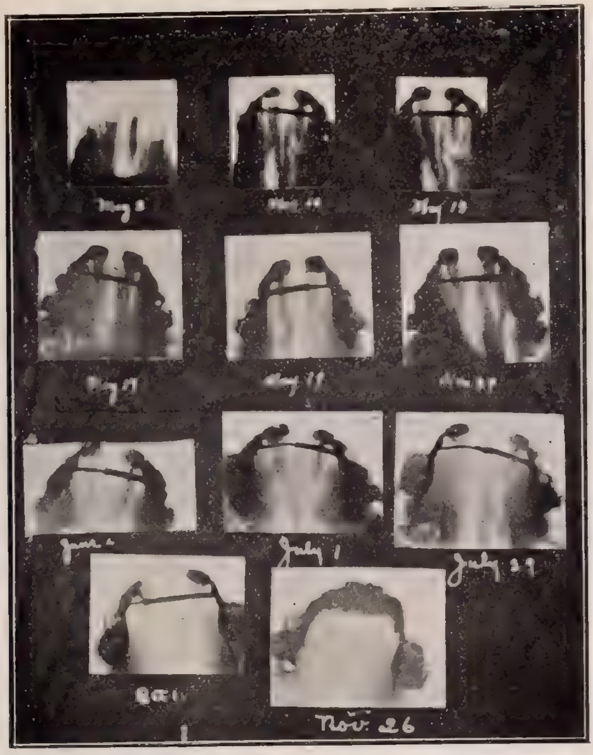


Fig. 47.

Fig. 48.

produced the change in the position of the teeth and maxillary bones as shown in Fig 44 at right. The occlusion of the arches was changed so completely that now the upper is entirely outside the lower, while before it was entirely inside, and he eats with ease and comfort. When we study these skiagraphs (Fig. 44) we find that the relation of the maxillary bones to the mandible has entirely changed. (See Fig. 43 at right.) You will notice that the central forward mass of the head has been carried forward, and these maxillary bones are now forward and outside of the mandible, and there is also a lowering of the base of the skull. The sella tursica is very clearly shown. Warren did not suffer from any part of the treatment and gained practically continuously. The changes in the boy are many and important. I want to speak first of the method of studying his voice. (A picture was shown of a record of the vibrations of the human voice in saying his name.) When I said "Warren Rang" I introduced into my voice consonants and vowels as shown in these vibrations in the upper record, and which have a definite relation to the bones of the head. When Warren said his name he made the lower record. When you compare his with mine, Warren, "wa," the "w" sound, the consonant, is entirely gone. It is almost a pure vowel, for the vowels have what we call synchronous waves. When he said his name, the sound of the "n," the characteristic nasal sound was almost lacking. "R-a-n-g." he had just one wave reproducing the "r" for "R-a-n-g." and he had mostly a vowel for "a-n-g." And that condition was largely due to the position of those bones forming the nares, which has largely been improved. Fig. 49 shows some of the changes in the boy's face, and if you will study them closely, you will see the change not only in the face but in the countenance, and the spark in his eye.

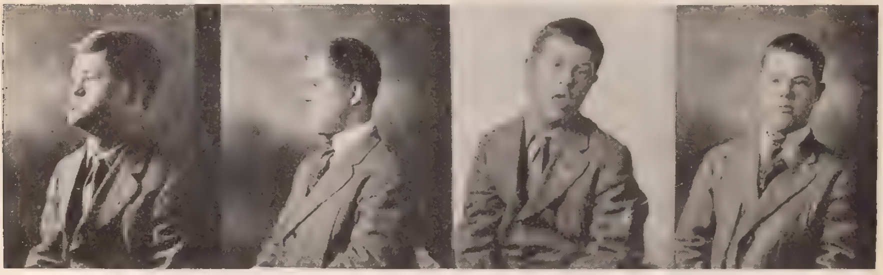


Fig. 49.

Fig. 50 shows us for comparison the profile and Fig. 51 the front view, before and after. The change I have suggested is not a physical one chiefly; it is a mental change, for Warren, who came to us six months ago, playing with little children's toys, so to speak, and choosing for his playmates those of four or five or six years of age, very quickly changed and chose those of greater age. At that time he did not care what boys or girls or women were in the room when he was undressing. Within eight weeks his mother said he wouldn't allow his sister to be in the room, and in a very short time he asked even his own mother to leave the room when undressing, and in twelve weeks that boy's reproductive organs changed almost the complete cycle that marks the period and that usually occurs when we speak of adolescence. Instead of having for playmates those of five or six years of age, if you please, he wanted my lady assistant to go with him to Euclid Beach and have a dance with him, and this within six months. (Laughter and applause.) Just a short time ago he wanted to know if he could borrow my automobile to take his mother for a ride. He wants to go to school, and almost every day as Warren would come to the office he would use new words, and I have never seen anything more interesting than to see that young life develop. We have all had a great joy in watching each day and week that he was taking in new situations, and was using new words and new phrases; for Warren, almost every time

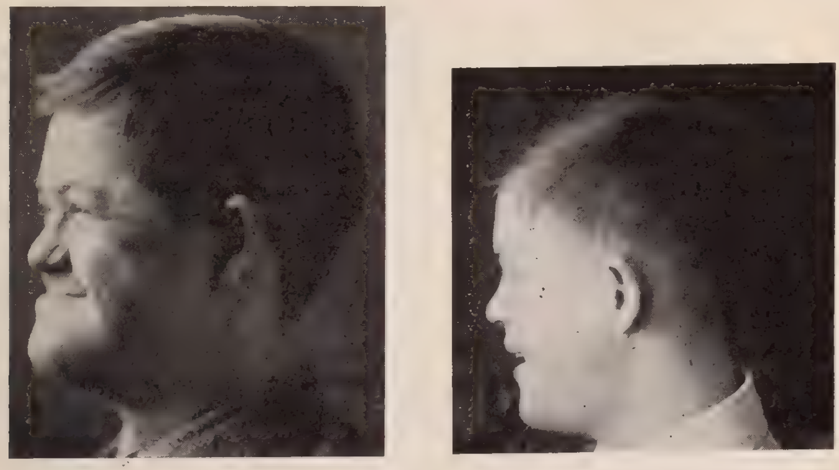


Fig. 50

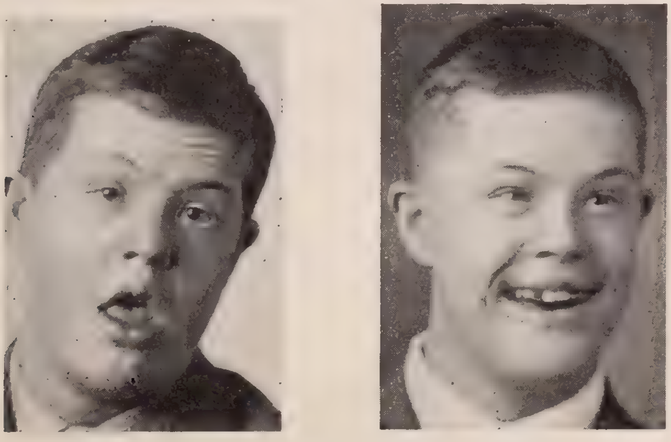


Fig. 51

he would come, would have some new words, and some of them very large, too, for his mental development, and he generally had them straight. He had a longing for new words and new ideas and new ideals, and it was a rapid growth. We saw him pass through the stages of hiding behind the door to scare us, of using pins and making witty remarks, some of which were very bright for him.

Now, the suggestion is that possibly we have here, not only an influence on the hypophysis by the forced movement and development of those maxillary bones, but vice versa, that the locking in of those upper teeth between the lowers, made pressure upward on the vomer and thence on the sphenoid bone and thereby making an abnormal pressure directly upon the hypophysis. And there isn't any question in the speaker's mind but that this boy's condition is partly one of hypophysis origin. He started immediately to grow a mustache. the hair starting to grow immediately as it does at puberty. He stopped asking a half a dozen or a dozen times while in the chair for something to eat. He largely stopped asking for a drink; he showed a remarkable change in his brightness, and immediately he started to grow generally and increase in stature. Now, there is not only an increase in the boy's entire stature, and a general development, but we have widened his face across the cheeks about one-half of an inch in a few months. The lesson is very clear to me that we as a dental profession have a responsibility that is very much greater than we have thought to these unfortunates who are placed in our state institutions and who can say that our responsibility to that boy is not even greater than it is to that rich man's child who need not be self-supporting. And I say that we as a dental profession have not only an opportunity but a great responsibility to go out and search, and, if possible, produce some great relief for this class of people. Our researches must, and will, include these benighted souls as soon as money can be found to make it possible.

Before thanking you for your very splendid attention, I want to say, regarding this clinical recording instrument, what I forgot to say at the time, that it is my desire, if there is any merit in it, that it shall be given to humanity and the medical profession as a contribution from the dental profession. I thank you. (Great applause).

DISCUSSION.

Dr. E. C. Kirk, Philadelphia: I was told that I was to speak on the subject of the President's address, and that I should have sent to me before the address was made a transcript of his remarks, so that I might have some intimation of what it was all about. I failed to receive the transcript, and until I sat in this hall this evening I hadn't the slightest intimation of what we were to hear. I think you will sympathize with me when I tell you that I feel as though I had been called upon to discuss perhaps the latest edition of the Encyclopedia Britannica. I must ask, however, to be excused from discussing the interesting report which the President has made upon his investigation of the silicate cements, and also I want to leave for some one else to discuss the question of his studies of the conditions which govern the contraction of cast gold inlays, and that brings me down to the machine. It is like discussing an eclipse or the aurora borealis or some natural phenomenon of that sort when we come to refer to this machine. I had hoped that this inventive genius would tell us that it would also record the gradual reduction of one's bank account, or perhaps have an attachment for paying the tailor. It really seems to do almost everything else. It certainly is a wonderful exhibit, and seriously, when we come to think of it—as we shall come to think of it much more after a while—what a boon it will be to the sufferers in hospitals, not only because of the precision with which it records the data with reference to the progress of diseases, so important for keeping the man at the helm in touch with his work, but how much it must add, just by reason of its precision and accuracy, to the saving of human life. Therefore, we can congratulate ourselves that out of the ranks of our profession has come this gift to humanity, through the medical profession from the dental.

I cannot say anything of Dr. Price himself. It isn't necessary. There are times like this when the thing itself is sufficiently impressive, so that it needs no words to express our appreciation of it.

And now I want to get down to a question that interests me in connection with some studies and some work that I have been doing for a number of years, and with some greater intensity recently; and that is the light that Dr. Price has shed upon this question of the enamel hypoplasias. But I want to say only a few words about it, because it is an intricate problem, and after all, anything that I shall say will be merely suggestive of the great possibilities of the subject. But you will see that running all through Dr. Price's exhibit the common factor is the absence of the normal nutritional supply of the child; that is to say, the mother's milk, the normal infant food supply, and the substitution of some other thing as infant food. Now, as I interpreted Dr. Price's explanation of the exhibit, he laid particular stress upon the difference in the kinds of infant foods that had been supplied to these children after they had been deprived of their normal nutritional supply. I can't say that the difference in kind of artificial food is not an important factor, but it seems to me that there is another factor which is of primary importance in this consideration, and that is just exactly the same thing that he has dwelt upon in connection with the surgical work that he has been doing relating to the development of the hypophysis cerebri. It has been pretty definitely shown by a number of observers that the secretions of certain of the ductless glands, particularly of the parathyroid, that the secretion or hormone of that body is an active principle, which has something very definite to do with the process of calcification; that where the parathyroid is destroyed or diseased, we may feed phosphatic food to an animal and it is not assimilated, and the quantity of phosphate that is taken into the stomach under these circumstances is rapidly eliminated in equivalent amount. We may present the food, but the patient cannot assimilate this phosphatic food element when there is a disease of the parathyroid. That is the trend of thought with reference to the function of that particular ductless gland. It is also pretty clear that in the milk of the nursing mother certain of these important stimulative properties of the ductless gland pass, among others the hormone of the parathyroid and though the child may receive phosphatic nutrient material in some other form it is the lack of that stimulus produced by the active principle of the parathyroid normal to the mother's milk which prevents the child from assimilating the phosphatic elements of artificial foods. So, therefore, there are two aspects of the question: the one to which Dr. Price has alluded, that of the difference in the nutritive value of the kinds of food, which makes it impossible for the nutritional mechanism of the child to secure sufficient phosphates from a particular kind of artificial food, and then there is the other, which we might call the negative aspect of the question, the lack of that stimulative property of the parathyroid, or of the thyroid gland itself, in the food which enables the child during this early developmental stage to assimilate phosphatic nourishment. Whatever may be the explanation, whether the one or the other, or both, it is particularly interesting to see what Dr. Price has brought out here, the synchronismal relation between these dentinal and enamel hypoplasias and the question of artificial feeding. I do not dare to permit myself to speak about the immorality, as I view it, of the woman who deliberately, from her own selfishness, handicaps her offspring with such conditions as that or who attempts to justify herself in withholding from her offspring the nutrition that God Almighty meant that it should have in order to give it its normal physical send-off in life.

With reference to the closing portion of the President's exhibit I haven't the slightest doubt in my mind that he is absolutely right, not only that it is a professional duty for us to take these apparently hopeless cases on the broad ground of humanity and do something for their relief; nor have I any doubt as to the explanation which he has given as to the reasons why that particular mode of treatment has produced that particular kind of result. So far as I am able to understand the subject, his conclusions appear to be, and I believe them to be, in perfect conformity with the best that is known upon that subject in a collateral way of the activities of the ductless glands and their inter-relationship with reference to the development and growth of the body and also in regard to their controlling powers as to nutrition. It is a new subject, one which is now exciting much interest the world over, and one which has not only produced important results already, but seems destined to produce very much more important results in the future. This subject is particularly interesting to me because I have just come, as Dr. Price has said, from Toronto, where I presented a study on the relationship which disturbances of the posterior lobe of the pituitary body bear to dental caries. I cannot go into that, but I think the connection is perfectly clear. I believe that we shall find in that relationship the key to a solution of the vexed question of why it is that we have susceptibility to caries, and why it is particularly associated with youth, adolescence and childhood, and why also that it is especially associated with pregnancy. I haven't time to go into that now, but will merely tell you that that is the subject of my address and that it will be published, and it is an interesting coincidence that this subject presented by the president has so definitely developed as having a particular dental interest and relationship. Dr. Price didn't say a word about scientific research in dentistry, as I had expected he would, but if he will bear with me one minute, I would like to say a word about that. I ask you to consider what you have seen here, and then I will offer it on his behalf as a demonstration of the truth of the contention that I have been making to the dental profession for the past quarter of a century, namely, that the most practical thing in the world is the most scientific. (Applause).

Dr. Victor C. Vaughan, Ann Arbor, Mich.: I have been simply overwhelmed, well nigh rendered speechless, from what I have heard here tonight. I don't know when I have been so gratified, when I have learned so much, as I have tonight. Nor have I been so enthused in a long time. I want to add a word to what Dr. Kirk has said about the value of scientific research. Medicine, including dentistry, is the application of what we get by scientific research for the prevention and cure of disease, and neither medicine nor dentistry—because they are one—can feed upon anything else save scientific research. Therefore it is fundamental to our professions that we should encourage scientific research.

I am glad that Dr. Price went to Grand Forks and got typhoid fever. (Laughter). This is a result of it. It is too bad that more people can't have typhoid fever, or something else, to stir up their intellects. I have thought how valuable such a machine as that would have been a few years ago in our own hospital. We had a serious offense—an interne was accused of kissing a nurse who was on watch in the ward, and the matter was brought before the medical faculty, and some of my colleagues said: "We will expel that interne for kissing a nurse." I said, "No." I walked some miles once to kiss a woman; (laughter) and I don't know that I am too old to do it tonight. (Laughter). I said, "I am willing to expel the young man for taking the nurse off the ward and distracting her attention from the patients, but for kissing her I am not willing to punish him at all.'' (Laughter). Now, if this machine had been in use, we would have had no trouble of that kind. (Laughter). We cannot estimate the value of such a discovery as this. I think it is one of the greatest things that has been made known to us; and all through, in every part of Dr. Price's work, I was deeply interested. I dare say that the time will come when we will be taking these newspaper boys and ragamuffins and so-called degenerates and making Daniel Websters out of all of them.

Now, seriously, the medical and dental professions must, if it is ever done, regenerate the world. Descartes said 200 years ago that if man was ever lifted up to a higher degree of intelligence and the superman was ever to be brought into existence, it must be through medicine; and that, of course, includes dentistry. There should be no condition in anybody, poor or rich, which skill cannot relieve—no such condition should be allowed to go unrelieved. (Applause). A government which does not use every effort to elevate to the very highest intellectual standing its citizens is a government that is not doing its duty.

When I was a child I used to read Sunday School books. I suppose you younger men don't read Sunday School books. Now, in most of the Sunday School books there were two boys; one was good and a numskull; the other was wicked and knew something. (Laughter). And there was always a contrast between the good boy, who didn't know much, and the villain, who knew it all. Now, I am glad to say that there is a marked change in this respect, and the people of this country are beginning to realize, the people of the whole civilized world are beginning to realize, that man has his physical, his mental, and his moral being. First of all, he is an animal; and he can't be mentally developed unless he is a good animal, a sound animal; and there is no moral development unless there is mentality back of it. Talk about conscience being a guide! Were not the thumb screws of the Inquisition turned on in the belief that they were serving God? It is intelligence that we want, and we want the medical and dental professions to move ahead and point out the way by means of which the superman—because he is coming—can be brought into existence; and there is only one way in which it can be done, and it is just by this kind of studies that Dr. Price has explained to you tonight. It has amply repaid me, doubly repaid me, for coming here tonight, and I am full of enthusiasm; and if this is the kind of work that the dental profession of this country is going to do, why for heaven's sake let them have every opportunity, all the money, all the material, everything they want. The nation can make no better investment than this. I thank you. (Great applause).

DR. VARNEY E. BARNES, Cleveland: We have listened to a very interesting talk by Dr. Price and most of his presentations have appeared to be very convincing. I am very glad to have been here to see and hear them. However convincing these observations may seem to be there are some which should not be accepted as facts or go without discussion and further consideration. In making this comment I do not wish to minimize the doctor's real work in any manner whatsoever.

First, I want to call attention to the fact that in the table of infant foods Dr. Price has classified Mellen's food along with the others. This is an error because Mellen's food is a modifier of cow's milk and is to be added to cow's milk so as to make it imitate the desirable quality of mother's milk. The mixture with and modification of cow's milk produces a quality which is varied by the amounts of milk and cream to be added. Therefore this food seems to be capable of producing with cow's milk a close approximation of mother's milk and should not be classed as it has been in this instance.

The hypoplasia of enamel, as shown by Dr. Price, seems to occur at the time the artificial feeding was resorted to and it probably does to some extent. Many times previous to this the question has arisen in my mind as to whether or not this hypoplasia of enamel and the under-development of the maxillary bones may be due to a pre-natal deficient nourishment and to a post-natal deficiency in the mother's milk prior to the artificial feeding, and I have concluded that it may be and most probably is due to this prior defect. Defective development and deficiency in mother's milk precede the necessity for artificial feeding—therefore we may not conclude that the artificial feeding is wholly to blame. We must note, however, that the infant under artificial feeding, no matter how good, after a setback with mother's milk would undoubtedly suffer from malnutrition and would be more likely to show the hypoplasia of enamel and of other structures as well. I have found in observing deformities of the maxilla and mandible that almost invariably (not always) the worst types have a history of artificial feeding and the necessity for it which is significant. We must consider the necessity for the artificial feeding before we attribute the defect in development to the infant food given—but the artificial food later becomes a great factor.

Second, I congratulate Dr. Price upon the results obtained so far in the last case of the boy with the deficient maxillary development. I can well appreciate this case for I have been operating on similar cases with good results for several years but I have never had the fortune to obtain a case like this in which the relief of pressure resulted in so great a mental gain. In these deformity cases the mental and physical ages do not agree. The greater possibility of improvement in such patients seems to be in those cases which may be designated as a maxillary deficiency as this one was. (I have been classifying two of the great classes of deformities as maxillary deficiency and mandibular deficiency as indicated by the greater defect.)

In separating the maxillary bones some ten or eleven years ago, I used a jack-screw across the mouth in a manner similar to that of Dr. Price's and the same treatment has been used by others for many years. This separating of the bones has been labeled ''opening the suture,'' and many men have claimed that it could not be done and have based their conclusion upon ''the consensus of opinion that it could not be done.'' Consensus of opinion is usually wrong in such observations. Dr. Price's observation of passing a probe between the maxillary bones is quite pleasing to me for I have been firm in the stand that the bones could be separated and that it was a desirable operation. I have repeatedly moved the separated bones with my fingers in those cases in which I have obtained a rapid opening of the suture.

In corroboration of Dr. Price's conclusions in this case I wish to say that in every instance, in every case of maxillary deficiency in which I have spread the bones laterally and rapidly opened the space between the centrals, the child has shown a marked mental and physical improvement. I treat all lateral expansions of the maxilla in this manner. Some of these cases have shown improvement because of a better tongue position and thus better breathing. Others have improved so suddenly that I had decided that the pituitary body might have been affected or relieved. I had even feared possible detrimental influence upon the pituitary body but not a single case has resulted in even the slightest evil effect. I had feared the possible evil result of a redeposition or overdeposition of bone, where it had separated, with a possible after-pressure but since there has been no bad result I have concluded that the method of treatment was beneficial. Whether or not these quick results are from a relief of the pituitary body, as claimed by Dr. Price, I cannot feel *certain*. In spite of much study we *know* comparatively little about the pituitary body. These cases should add much to our knowledge and it will be interesting to have a report from Dr. Price on this one after several years. I have found that some cases improve and keep on, others seem to go back again to some extent.

Now as to the effect upon the mentality. I have had and expect to obtain a good effect by this treatment in those cases in which the brain structure is good, and I expect a lesser effect upon the poor brain structures. Dr. Price's case evidently had a superior brain quality.

I might mention in particular two of my cases of poor mentality which improved markedly after suture opening or after relief of internal pressures.

The first was that of a boy from Michigan, brought to me after the dental department at Ann Arbor had concluded the case was hopeless. The suture was opened, making such a change in the boy that he learned the alphabet suddenly whereas before the treatment he could not be taught.

The second was treated in a similar manner but the case also involved a bicuspid impaction. The results were slower, but the boy, a defective twelve-year-old in the second grade, suddenly promoted himself and proved capable of third grade work. It is too soon to conclude that the pituitary body is relieved but the evidence of sudden changes after this method of expansion *seems* to indicate that this body is affected in some manner and I trust that my remarks may be taken to corroborate in a measure what Dr. Price has given us tonight, even though they do not prove his claim. (Applause).

LOCAL OR INHIBITIVE ANESTHESIA

BY W. J. HOGAN, D.D.S., HARTFORD, CONN.

A METHOD OF PRODUCING such numbness in different parts of the body that operations may be performed without sensation of pain to the patient has been discovered and developed by careful research, study and experimentation by Dr. Wm. H. Fitzgerald, a nose and throat specialist of Hartford.

The agent he uses to procure such condition is a simple metal probe tipped with absorbent cotton. This probe is applied with different degrees of pressure to certain areas in either the nose, throat or pharynx, and it causes anesthesia in the affected part of the body. Sometimes the cotton is dipped into a dilute solution of trichloracetic acid before applying.

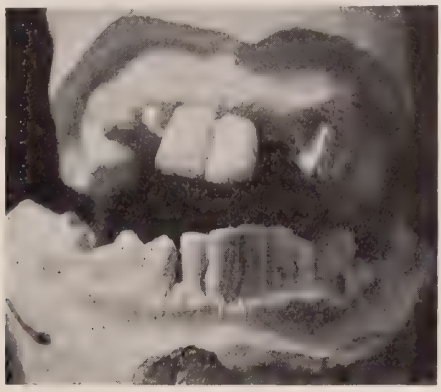


Fig. 1

Already Dr. Fitzgerald has given some few clinics. At St. Francis Hospital before the Hospital Staff as early as November last, he gave a demonstration of his method with most satisfactory results. The physicians saw the specialist anesthetize and operate upon several patients within his own specialty, even going so far as to puncture an ear drum, a most delicate and painful operation, and the patients felt no pain. Other operations were performed by the hospital physicians after Dr. Fitzgerald had anesthetized the patients; and the operations were painless and successful. The doctors were much amazed and they testified that the discovery of this means of local anesthesia was marvelous.

On January 18th, 1914. four dentists, including the writer, witnessed a clinic given by Dr. Fitzgerald. A patient, who had several teeth to be extracted was anesthetized by him, and when she said she felt no sensation in the jaw, Dr. Sears immediately extracted the teeth without pain to the patient. (Fig. 1 shows the mouth before extraction and Fig. 2 after extraction.) Another patient was brought in and when the probe was placed upon different points in the nose and throat she traced sensation to different parts of the body. The eye of another was rendered so insensitive that there was no reflex action when the probe was touched to the eyeball.

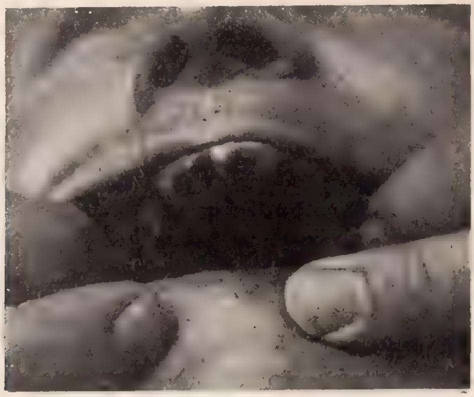


Fig. 2

Blood was drawn with a sharp instrument from the thumb of another patient without any feeling of pain.

I have watched Dr. Fitzgerald about ten or twelve times and can now anesthetize my own eye by probing a certain area in my nose, so that I do not experience any sensation when the eyeball is touched. I also anesthetized the gum in the region of the lower left cuspid in my mouth so that the doctor punctured the membrane without pain to me.

Wanting to try this upon some one else, I asked Dr. Sears to allow me to anesthetize his gum, which I did by a pressure upon the lip. He felt no pain when I lanced his gum. Becoming bolder, with his permission, I anesthetized his eye so that he felt no sensation when pressure was put upon it.

On January 25th, we were with Dr. Fitzgerald again, and after watching him for some time I became more enthusiastic and again anesthetized my own mouth. Dr. McLean punctured the mucous membrane in three places as far in as the alveolar process and I felt no pain whatever.

On January 25th, at a special meeting of the Hartford Dental Society, Dr. Fitzgerald was present and gave a few demonstrations of his method.

One of the dentists present complained of a headache, and at Dr. Fitzgerald's request I cured the headache by applying pressure along the gum as far up as could be reached. The same dentist's lip was anesthetized so that it was punctured painlessly.

With only the aid of Dr. Fitzgerald's method, a sixth-year molar was extracted from a woman's jaw, while she felt no pain. The ear lobe of another woman was so anesthetized that a tiny instrument was pushed through it.

There were present at this meeting about thirty-five dentists and two physicians, all of whom were interested and enthusiastic, and Dr. Fitzgerald was warmly thanked. One very conservative dentist of ripe age, whose name would give great weight to any opinion, said he was glad to have lived to see such a wonderful discovery.

Dr. Edwin Bowers, a well-known magazine writer, spent several days in Hartford watching Dr. Fitzgerald and wrote a lengthy article upon his observations. The article appeared in the magazine section of *The New York World*, dated December 28, 1913.

Dr. Fitzgerald will give a paper before the Connecticut State Dental Association, April 22, 1914, in Hartford, and a clinic the morning following.

CHRONIC ORAL INFECTIONS ASSOCIATED WITH TEETH; AND THEIR TREATMENT

ILLUSTRATED WITH STEREOPTICON

BY WM. H. G. LOGAN, M.D., D.D.S., CHICAGO, ILL.

(Continued from March Summary)

When one-half of the roots of a tooth, or roots of a number of teeth, are standing denuded and extensive bone loss is present, even to a less degree than shown in slides No. 6 and 7 and the cavity lined with a cyst membrane extending as it did in this case from the left superior incisor to the first molar, and partial absorption of the bone forming the anterior wall of the antrum has occurred, the lateral cuspid and both bicuspids should and have been extracted. The demand for the removal of the second bicuspid was occasioned, in spite of the fact that normal attachment still existed about the immediate apex and entire distal surface, because I found when operating that the mesial and lingual surfaces of this tooth were devoid of pericemental attachment for over one-half of its length just below the apex. I believe this extensive alveolar and bone destruction had its origin in a cyst which later became infected by the development of an acute dento-alveolar abscess which had its origin in the pulp of the lateral incisor. The degenerating cystic membrane lining the entire cavity from central to molar was peeled out of the bone cavity in one piece and a section of it which is devoid of epithelial cells is shown in slide No. 8.

The lack of a full appreciation of the pathologic findings presented in various cases of destructive processes occurring in the jaws about root ends has resulted in the amputation of many roots where extraction was indicated and in other instances extraction had been advised when a tooth could have been saved by root amputation. And many of these teeth have been needlessly lost after the amputation had been properly performed because the operator had overlooked the presence of the remnants of a cyst, which may precede as well as follow the chronic dento-alveolar abscess. This last statement is made with a full appreciation of the idea held by many, that those cysts found about teeth involved with a chronic dento-alveolar abscess, always follow and never precede the chronic infective process in the periapical tissues.

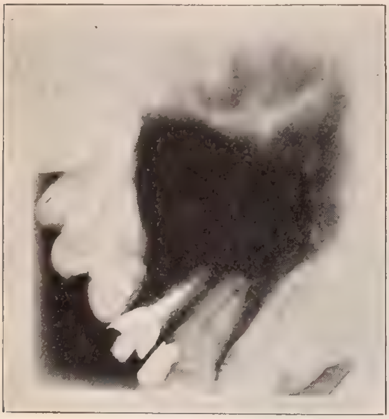


Fig. 6.

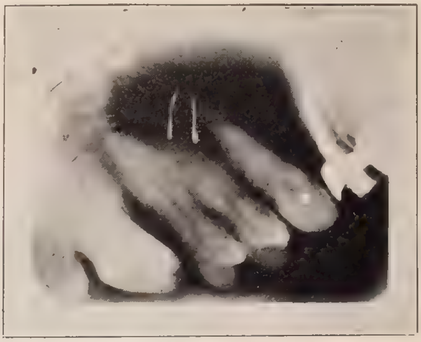


Fig. 7.

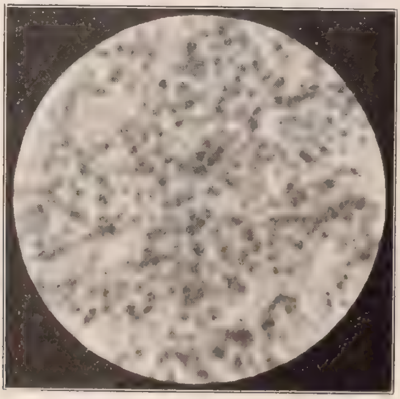


Fig. 8.

The presence of a cyst is shown in slide No. 9 involving the tissue between the lateral and cuspid some distance from the apex and as I will prove by a later slide it can, by its characteristic gradual growth occurring without pain, ultimately cause absorption of bone, alveolar process and pericemental tissue about root ends. When cysts approach root ends, the pulps in some instances will die as a result of this circulatory disturbance and degeneration of these tissues be hastened by a septic or putrefactive process if dry gangrene does not occur, providing the pyogenic or saprophytic bacteria have gained access by circulation to the pulp or through congenital or acquired defects of enamel and dentin. When putrefaction or septic invasion of the pulp becomes active and passes beyond the root canal, the cystic membrane, if in close relation to the root, may become involved with the infective process, providing such a cyst was lying in such close proximity as the one shown in slide No. 10 now upon the screen.

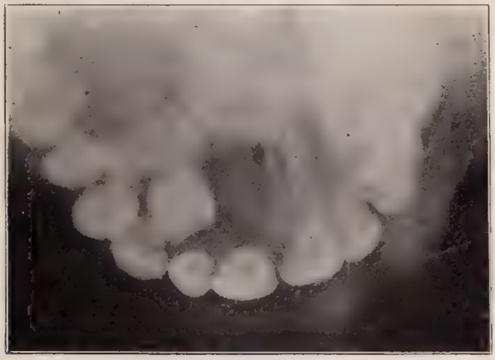


Fig. 9.

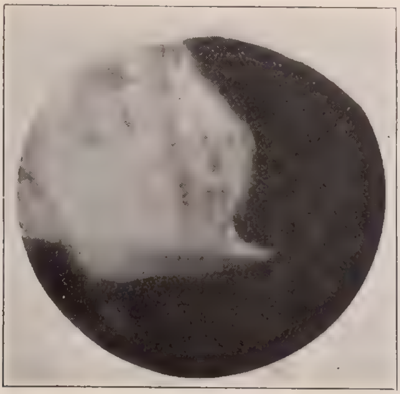


Fig. 10.

This cyst extended from the right molar forward around the entire facial portion of the mandible to the second bicuspid on the left. In its development, which occurred without discomfort, it grew to a degree that gave the patient an appearance of having an abnormally prominent chin. Bone absorption of the entire thickness of the mandible at the symphysis took place in small areas, for upon the removal of the cystic membrane, was able to pass an instrument into a number of small openings through the thin layer of remaining bone on the lingual surface at either side and above the attachment of the diagastic muscle. The apex and one-third of the labial surface of the roots of the four incisors had their alveolar and pericemental support destroyed. The cuspids and one bicuspid were in a like condition but to a lesser degree. All pulps showed normal vitality except the two incisors. Both of these gave slight reaction, however, the left incisor's pulp vitality was seriously questioned.

To ascertain whether or not our cyst was uncomplicated with an infective process from the teeth, we withdrew some of the cystic fluid and had it placed upon proper culture media. This examination was carried on by Professor Orendorf. No growth was secured, showing our cyst was uncomplicated; however, when we opened into the left incisor a few days after the operation superficial infection of the ulcerative type of septic pulpitis was diagnosed clinically and bacteriologically proven. The condition of this case four years later is seen in slide No. 11. Therefore, I take it that you will agree with me it is fair to assume that had this case been allowed to go untreated for a much longer period, an acute septic process would have developed in the pulp of this central incisor, which was free from caries; and the cystic membrane that had nothing intervening between it and the root end would have become infected, with the result that at least a part of the epithelial cell lining of the cystic membrane would have been destroyed. And if the case had been allowed to become chronic with periods of acute exacerbation, a sinus in the labial tissues would probably have resulted through which the pus and cystic fluids would make their escape. The more chronic the infection and the more frequent the occurrence of acute attacks, the more rapid and extensive would be the destruction of epithelial cells, to the end that if the patient had presented at a later time with a sinus, the natural mistake of stating that our extensive bone destruction was the result of a chronic dento-alveolar abscess would have been made.

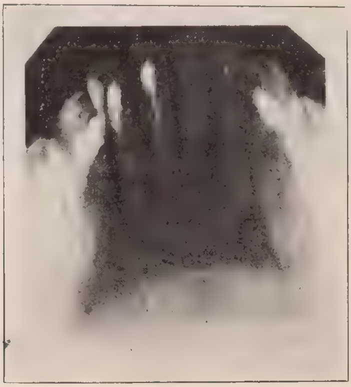


Fig. 11.

To prove that functionating cystic membranes are present in some of our chronic alveolar abscess conditions, I call your attention to slide No. 12, which was made from the tissue lining an apparently uncomplicated dento-alveolar abscess with a sinus extending from the mesial root of a first molar well back under the roots of the second molar. The distal root of the first molar contained a faulty root filling and was standing denuded for one-half of its length in the abscess cavity. This specimen shows the absolute presence of epithelial cells which accounted for the character of discharge found upon examination made immediately following an acute attack. A copious discharge of pus was seen coming through the sinus, but the sticky consistency of the escaping fluid led me to believe we had the presence of a cystic membrane complicating our dento-alveolar abscess. The correctness of the diagnosis is shown in the specimen now upon the screen, for you here observe epithelial cells lining the membrane removed from the abscess cavity. A similar specimen taken from a similar case with like diagnostic findings about a superior left bicuspid is shown in slide No. 13. Slide No. 14 was taken from another bone cavity about a

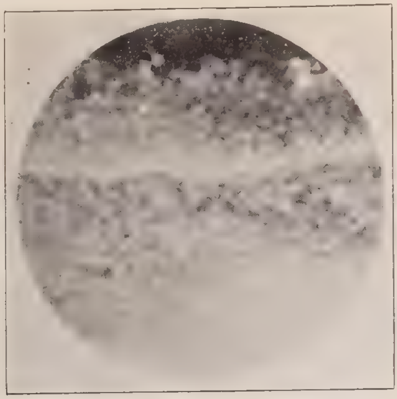


Fig. 12.

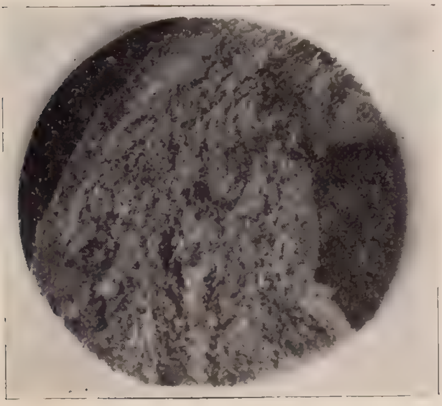


Fig. 13.

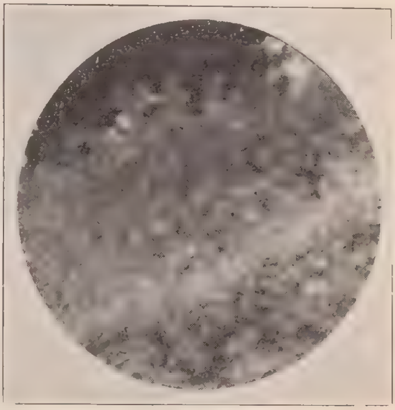


Fig. 14.

right superior lateral. All of these cases had been diagnosed as ordinary chronic dento-alveolar abscesses, because a faulty root canal filling was present, a large area of denuded root was standing in the cavity and a sinus was present in each instance.

DIAGNOSIS OF A CHRONIC DENTO-ALVEOLAR ABSCESS WHEN CYSTIC COMPLICATIONS ARE PRESENT.

From the description of the above cases and the frequent occurrence of many similar ones in practice, I believe there is need for outlining the differential diagnosis between the ordinary chronic dento-alveolar abscess with bone complications, and the chronic dento-alveolar abscess with cystic and bone complications. The point I wish to make most clear is that in many of our chronic infective processes spoken of as dento-alveolar abscesses or bone abscesses about root ends when a considerable amount of periapical tissue has been destroyed, we should keep in mind the possibility of the presence of a cystic membrane in the field before determining what course of treatment is indicated. This can be done by carefully examining the escaping fluids from the sinus or those which enter the root canal during treatment. In those cases where absorption of the root end has taken place, leaving a slightly or extensively enlarged apical foramen, you have often observed upon removal of the root canal dressing even after two or three treatments, a sudden flooding of this canal with a sticky amber-colored fluid, which does not have the appearance of the secretions created by the pus-producing bacteria, for the reason that this amber-colored fluid is the result of the presence of an epithelial-covered fibrous membrane which in part or entirely covers the walls of our bone cavity about the root end. Just so long as these epithelial cells continue to live, just so long will this root canal be flooded every time the treatment is changed.

In the instance of an acute exacerbation of a dento-alveolar abscess complicated with a cystic membrane, upon opening into the tooth for the first time pus will be seen to drain into the canal, but if the cystic membrane is present, after the pus has ceased to flow a tendency to persistent weeping of a sticky amber-colored fluid will be made out by the careful observer. In those instances where our dental cyst is small, the epithelial cells which line the entire cystic membrane may degenerate as result of an acute diffuse alveolar infection.

TREATMENT OF A CASE WHERE THE HISTORY AND FINDINGS PROVE YOU HAVE A DENTO-ALVEOLAR CONDITION COMPLICATED WITH A CYST.

The only positive method of treatment is to enter the periapical field through the alveolar plate and surgically remove the epithelial-covered membrane and amputate the denuded end of the root, providing that it is roughened or has been denuded for a considerable length of time, or to extract the tooth and remove the membrane if it does not come away intact with the root as it sometimes does when the cyst is exceptionally small.

Although the above method is the only one I know of which will give definite results, I have, in a few instances, successfully coped with this condition where the destruction was but slight, by evacuating the cavity as thoroughly as possible at the second sitting, then introducing phenol 95% through the root canal into the infected epithelial-lined cavity beyond the tooth. I would not follow this course of treatment if the bone destruction was much larger than one-half the size of a pea, and if the root end had been long or extensively denuded or roughened. By keeping the area well filled with 95% phenol for a five-minute period, and removing it with alcohol, the epithelial cells will be destroyed in some cases.

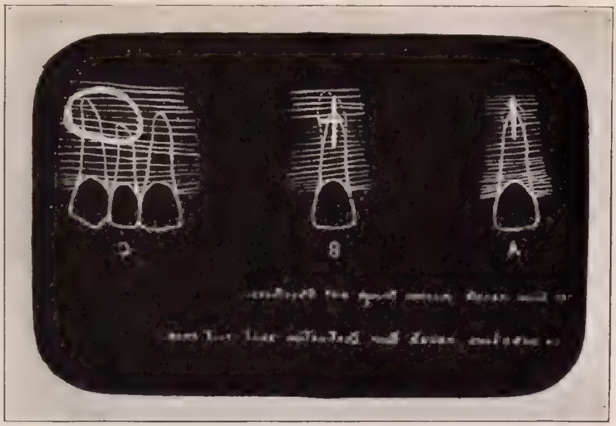


Fig. 15.

However, before leaving the question of treating this condition let it be stated that great harm might ensue from the use of 95% phenol in advanced cases of this character. Therefore, you are cautioned against its use except in most favorable conditions. Although many teeth have been filled when the cystic fluid was still weeping into the canal and no immediate ill effects seemed to follow, I wish to close this part of the discussion with the statement that he who leaves such a group of epithelial cells in such a location, leaves a condition that under certain irritating conditions may cause the loss of a great portion of the jaw and under more unfavorable conditions the death of the patient may follow by the development of a carcinoma that had its origin in these epithelial cells, that probably came into this field as remnants of the enamel organ.

TECHNIC OF ROOT END REDUCTION AND AMPUTATION

The terms reduction and amputation are here employed to differentiate the operation of smoothing and reducing the length of a root in variance to the procedure of cutting through the root and removing a portion of it in one piece. When the periapical destruction is as limited as was shown in slide No. 2 and is illustrated in figure A in slide No. 15 now upon the screen the steps to be followed are here outlined in their regular order. *First*—Start a straight incision a few lines above the root end, through the mucous membrane and periosteum and continue it crownwise for one-third to near one-half of its length. *Second*—Now, with a keen periosteotome elevate the tissue from the bone to either side of the incision and beyond the root. *Third*—Place some one of the various formed retractors made for the purpose into the wound and with it force the soft tissues well back, thus exposing our sinus and any remaining intervening bone and alveolar process overlying the denuded root. *Fourth*—With the retractor in position let us now, and not until now, turn our attention to controlling the hemorrhage which slightly interferes with the perfect examination needed to determine to what extent we should enlarge the sinus through the bone to gain perfect access to the root and bone abscess cavity.

The constant pressure caused by either of the self-retaining retractors to be shown later, which are modifications of certain well-known mastoid retractors, has a constant beneficial effect upon the reduction of the flow of blood. However, before you start the initial exploration of the abscess cavity pack with gauze or cotton between the edges of the wound with the retractor in position, for a sufficient period to secure practically a dry wound. Such a retractor once properly placed need not be removed until the operation is completed. *Fifth*—Having for a time controlled the obstructing hemorrhage and the root now in view, pass a sharp steel probe into the abscess cavity through the sinus at the root end and learn to what extent the pericemental attachment is destroyed. When you have positively ascertained to what degree the root is denuded, with cross cut enamel bur or chisel remove the intervening bone and alveolar process if both are present. Care should be exercised in taking away this overlying bone that the cut is not made too far towards the crown, thereby destroying healthy alveolar process with its underlying attached pericemental membrane. If you cautiously enlarge the sinus and make frequent examinations with a steel probe, this oft-occurring error can be avoided. *Sixth*—We have now an unobstructed view of the periapical field and if only one-fourth or one-fifth of the immediate end is denuded and there is little periapical tissue involvement, I would not amputate the root because of the difficulties sometimes encountered in removing this small end. The very old and more simple method of root reduction is confined to this degree and is accomplished by carrying a fissure bur back and forth over the end of the root until it is reduced to the point of normal attachment.

When the destruction and denudation has proceeded to a degree or slightly beyond that represented in figure B, make a perpendicular incision as in the preceding case, only add a short cross incision at a point just below the root end. This gives us a larger opening through the soft tissue which is needed to care for the case without putting too much tension upon the structures with the retractor. If the destruction is as extensive as shown in figure C, a circular incision as indicated should be made and a removal of all underlying soft tissue and bone to the root or roots accomplished, leaving a saucer-shaped opening about the sides and lower surface. However, by not removing all of the soft tissue and periosteum quite to the upper border of the entrance to the bone cavity, we gain the beneficial effect of having this free flap of tissue drawn into the wound, which is a great aid in getting the cavity to fill rapidly from above downward. In each instance where the soft tissues are retracted and the intervening bone removed the next step, if reduction of the root is not indicated, is to proceed with root amputation at the line of pericemental attachment, and with a strong chisel or hook lift the amputated piece from its bed, dry the field and carefully examine all remaining walls of the cavity for a smooth, glistening surface tissue which has the appearance of mucous membrane and is in reality the remnants of a cystic membrane that we are very liable to find lining some part of many of our alveolar bone abscess cavities. Now carefully curette to healthy tissues in all directions and be sure to remove any fibrous membrane covered with epithelial cells, which may be present. Pack the wound with gauze incorporated with Buckley's euroform paste. Application of this remedy reduces to the minimum the post-operative pain. Gauze to remain in twenty-four hours and in those instances where the straight or cross incision has been used Beck's bismuth paste should be injected at the second sitting, after irrigation with normal salt solution and examination of the cavity. If the round incision was made, the packing should be changed daily for five to ten days to stimulate rapid granulation. After this the patient can easily irrigate the part himself. Bismuth paste for the first two cases should be continued twice or three times a week until the cavity is almost filled, then once in a week to ten days until the incision closes. Until the adoption of Beck's bismuth paste as a therapeutic agent the straight and cross incisions were not successful for root amputations because stagnant fluids were retained and re-infection usually occurred; but with the use of Beck's paste re-infection is the exception rather than the rule, providing root amputation was not undertaken when extraction was demanded. As to who might first have used the various steps here

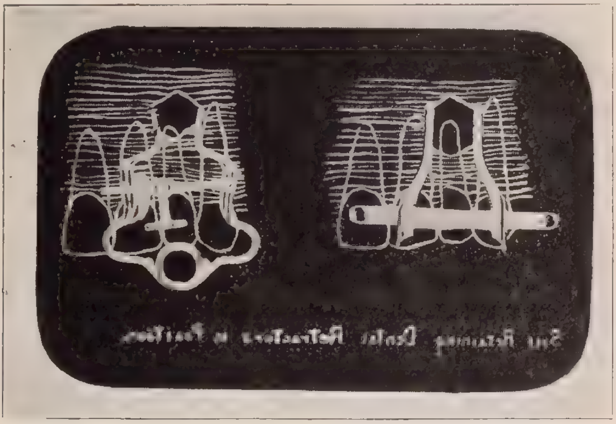


Fig. 16.

outlined for root amputations, I am not prepared to state, but I feel sure that it would be safe to assume that these and every other possible method that could have been outlined have been similarly employed by various men in every community where dentistry has been practiced. Slide No. 16 shows the self-retaining dental retractors in position. Personally I favor a one-half- to a two-per cent. solution of novocaine for local anesthesia in preference to cocain or general anesthesia for this work.

A BRIEF STATEMENT HAVING A BEARING UPON THE DANGERS OF LEAVING IN THE JAWS BROKEN-OFF ROOT ENDS, WHICH ARE PARTIALLY COVERED OVER WITH SOFT TISSUE.

The local dangers and systemic effects that often follow persistent chronic dento-alveolar abscesses are not greater than those accompanying the presence of a broken-off root, usually covered with gum tissues; for such a root in this environment is a potent cause of oral sepsis and possible general toxemia, rheumatism, anemia, acute and chronic heart lesions and osteomyelitis of the jaws. As an example of osteomyelitis and necrosis of the mandible resulting from retention of broken off roots, I here present a photograph in slide No. 17 of a section of jaw removed from Mr. Joseph L., age 52 years, whose entrance into the hospital was occasioned by pneumonia. After the crisis had been successfully passed, general resistance was naturally low and an infectious swelling began along the left

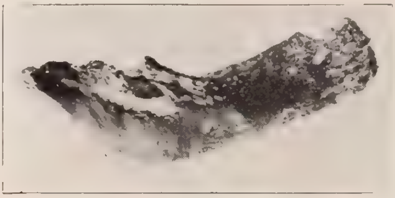


Fig. 17.

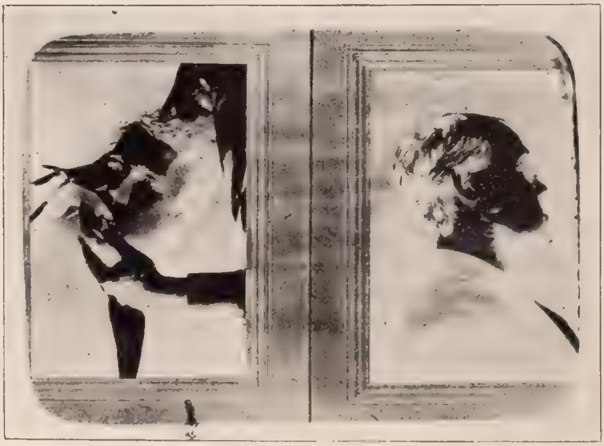


Fig. 18.

buccal and inferior border of the mandible. The physicians in charge examined the mouth and did not find any teeth or roots posterior to the cuspid on the left side. The acute infection not having the cause removed became chronic and many discharging sinuses opened upon the cheek and neck as shown in slide No. 18, and the condition of the mouth at the time the patient was referred is also seen in this slide, which shows the anterior portion of the necrosed bone separated from the healthy in a line just posterior to the left central incisor. When I removed this section of the mandible, extending from the neck of the condyle to the central, I found in examining the gross specimen seen in slide No. 19 unmistakable evidence that the initial infection has its origin about the imbedded second molar root fragment which was almost covered with gum tissue. The lesson is that such roots should always be removed when found, for fear of disastrous local and serious systemic effects.

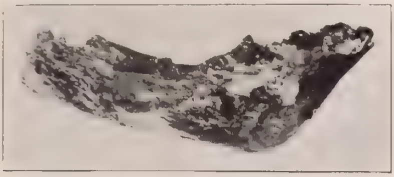


Fig. 19.

We shall now turn our attention to the discussion of certain phases of the question involved when we are called upon to determine what should be done for teeth that are affected with such chronic infective processes as are termed by the dental profession pyorrhea alveolaris.

I believe that we should arrive at some definite conclusion as to the advisability of treating pyorrhea teeth, and under what conditions it is advisable to institute treatment and when it is our imperaive duty to extract rather than treat these cases. I believe such a discussion is timely, for the reason some prominent general practitioners are contending that this condition, after it once gains a foothold, is beyond control; and on the other hand, from some enthusiasts engaged in the treatment of pyorrhea. I am led to believe by their oral and written statements that they hold that practically every pyorrhea tooth which can be retained without too much discomfort to the patient should be treated in spite of the fact that the life of the tooth, even when placed under a splint, is brief and recurrent periods of infection are liable to follow.

This state of affairs leads me to make the endeavor to answer the question: When should we treat and when should we extract teeth involved with pyorrhea alveolaris?

The prognosis of teeth involved with phagedenic pericemental alveolitis or pyorrhea alveolaris (so-called) can in a general way be quite accurately determined after taking into consideration the following important factor: *First*—Will the patient do her part to maintain a condition of oral cleanliness and return with sufficient frequency for the needed subsequent treatments until the pockets can be filled in by nature? *Second*—If the patient presents with abnormalities of occlusion or loss of normal contacts and we find crowns and fillings that are having injurious effects upon our remaining supporting structure, and she will not have these rectified, treatment should not be undertaken with the idea of gaining permanent results. *Third*—Whenever we find a patient presenting with a history of chronic systemic low vitality which was not caused by the oral sepsis, we should be very guarded in our statements in reference to the prognosis, unless we have reason to believe that her general health can be raised to and sustained near the normal. *Fourth*—Having taken into consideration the above three points, and having decided in favor of treatment insofar as influenced by these conditions we should now examine carefully the field about the tooth to determine the amount of remaining supporting structure.

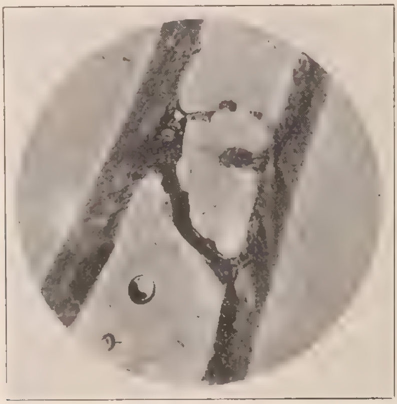


Fig. 20.

I believe the prognosis is good with single-rooted teeth when the pocket is confined to the gingival third. The prognosis as here outlined is only fair when the middle third is rather extensively involved at the junction of the apical third. Slide No. 20 shows the normal tissue of the area and accurately outlines the direct blood supply from the pericemental membrane of one tooth through the alveolar process to the pericemental membrane of the adjacent tooth. It also indicates the great harm that is frequently done by leaving an extensively involved pyorrhea tooth, after we know it is hopelessly diseased. Our imperative duty is to extract every pyorrhea tooth as soon as the prognosis is decided to be hopeless and thus as far as possible prevent the serious systemic effects of such chronic focal infections and the spreading of the disease by continuity through the openings in the alveolar process.

The prognosis is held to be bad or hopeless in practically all cases where less than one-third of the supporting structure remains, and whenever a tooth will sink into its socket pronouncedly as if on a cushion from slight pressure, treatment is not indicated and immediate extraction is called for, in spite of the fact that such a tooth can, in exceptional cases, be put under a splint and kept comfortable for a long period. A tooth will act in this way only in the absence of an acute inflammation, when we have had the loss of the pericemental fibers radiating across and upward to the alveolar process in the middle third.

The prognosis of teeth with multiple roots having the same amount of supporting structure lost is always more serious and can only be considered fair if the tissues in the bifurcation have been fully involved, and hopeless when the tissues of the middle third are sufficiently destroyed as to allow the retention of food between these roots, unless we destroy the opportunity for future lodgment of this food. To prevent the necessity of extracting such a tooth in the case of an upper first molar where the attachment is wholly destroyed about the lingual root as shown in slide No. 21 and the remaining tissue is found between the buccal roots, so as not to expose their buccal bifurcation, we can save one-half of the tooth for bridge abutment if needed, by excising the lingual root with all of that portion of crown supported by it. Then give the case a rest for a month or two, if any doubt exists in the mind of the operator as to the future usefulness of the remaining portion, and subsequently reproduce with inlay or crown the lingual contour. In those cases of extensive pyorrhea involvement about one root of the lower first molar, while the attachment about the other root is good, a tooth that is equal in strength to a bicuspid for crown or bridge work can be secured for permanent use by cutting through the body of the crown at the junction of the distal with the mesial root and removing the hopelessly diseased portion. The same method of treatment is indicated if an incurable alveolar abscess is confined to one root of the lower first molar.

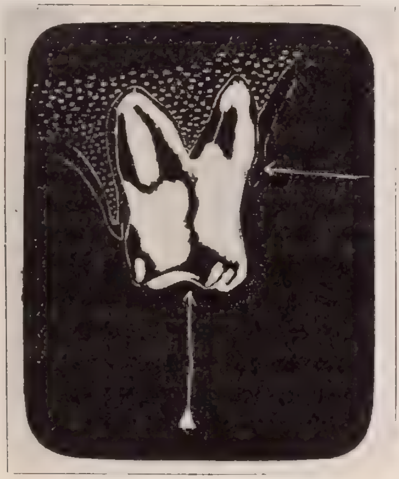


Fig. 21.

The purpose of this paper has been to create if possible a greater interest in the more exact determination of the character and extent of the chronic destructive processes found involving the supporting structures of the teeth and to urge the members of the medical profession as well as those of the dental profession not to request the removal of a tooth simply because its surrounding tissue has in part been destroyed by such a chronic disease as pyorrhea alveolaris or a dento-alveolar abscess, unless an intelligent reading of the pathologic findings presenting, surely inform us that this tooth cannot be retained and the chronic infection controlled. In other words, let each case be decided upon its merits and in and above all let us endeavor to be sane.

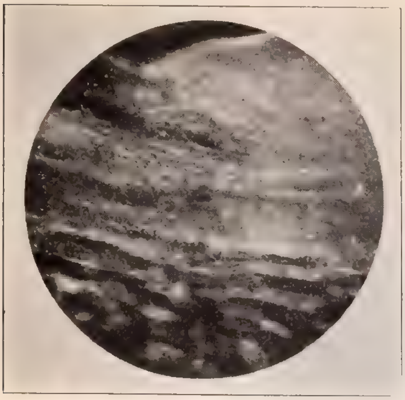


Fig. 22.

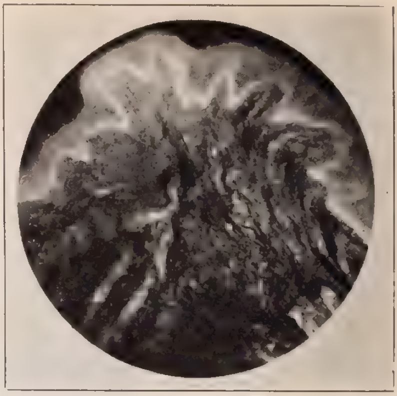


Fig. 23.

In slides Nos. 22 and 23 are shown the tissues in their entirety from a non-inflammatory cyst, at the border of the section slide 22, we find the epithelial cells with an underlying well defined basement membrane, next the layer of connective tissue and beyond a few bone cells, and in slide 23 which is the remaining portion of the section we see the normal mucous membrane common to the soft tissue of the mouth overlying the bone.

On a Friend's Passing

The earth can renew her spring glories, but a friend
gone comes back to us never;

The door of his heart-room clangs to, and remains closed
for ever and ever.

The chambers where friends dwell are numbered, so few
are they in the testing—

Another to-day becomes darkened, and friendship comes
not for the questing.

Which one will be closed on the morrow? Will a month
or a year shut another?

Then I pray: Take me, God, ere the last one, myself
still a friend to some other.

—Lippincott's.

THE POSSIBILITY AND PRACTICABILITY OF PUBLIC SCHOOL DENTAL CLINICS*

BY W. G. EBERSOLE, M.D., D.D.S., CLEVELAND, OHIO

SECRETARY-TREASURER OF THE NATIONAL MOUTH HYGIENE ASSOCIATION

I HAVE THE HONOR upon this occasion of representing the National Mouth Hygiene Association, an organization which was formed for the purpose of spreading the mouth hygiene propaganda so that the American people might be led to know and understand the important relation that mouth hygiene bears to the general hygiene of the body.

This organization was formed for the purpose of permitting all people who are interested in this important subject to co-operate in the interest of humanity.

While it is the purpose of the organization to deal with the problem as a whole, we have found it necessary to divide the work into a number of divisions, placing each under a department of its own.

One of the most important divisions of the work is that which deals with the establishment of dental clinics, hospitals or dentariums, where proper care and treatment may be afforded those who are unable to care for themselves; providing not only dental service but furnishing tooth toilet articles which will enable the poor to take care of the "gateway" to the human system in a manner which will permit of the highest development from a physical standpoint.

It is my mission upon this occasion to state that after years of experimentation and investigation we are able to come before this body with the statement that we have evolved a practicable plan for the establishment and maintenance of school dental clinics in the various communities throughout the United States.

It is the purpose of the National Mouth Hygiene Association not only to establish dental clinics for the care and treatment of the worthy poor, but to raise an endowment fund sufficient to guarantee the successful operation of these clinics indefinitely.

It is impossible in the length of time allotted for papers to be presented in connection with this Congress to enter into a full and complete explanation of the methods to be employed by the National Mouth Hygiene Association in establishing these clinics.

In a nut shell, we will state that the National Mouth Hygiene Association's campaign embraces all that is good in the great campaigns which have dotted this country with beautiful Y. M. C. A. buildings; and also all that is good in the great money-raising campaigns that have made it possible to build hospitals, establish dispensaries and erect many of the great philanthropic institutions that flourish in every part of the world.

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*Delivered before the Fourth International Congress on School Hygiene, Buffalo, N. Y., August, 1913.

Our campaign embraces all that has meant success in these or other money-raising campaigns and in addition it embraces a feature which, if employed alone, would result in the successful raising of funds to meet the work we are undertaking.

Our campaigns are waged in the interest of the school child and, therefore, the school child is the hub of the campaign.

The Young Men's Christian Association is established for the purpose of saving the souls of young men.

Hospitals and philanthropic institutions are for the healing of the sick, the relieving of the wounded, or the care of those who are physically unable to care for themselves.

Worthy institutions these, and I would that we had more of them; but great as is the cause in which these institutions have been erected, greater still is that for which the National Mouth Hygiene Association has been formed.

The National Mouth Hygiene Association stands for the removal of the shackles that are binding the school children down to sin, sickness and death by forcing them into schools where they are surrounded by conditions which, if we accept the statement of the Michigan State Board of Health, are destroying 27.6% of the public school teachers, who preside over these children, by tuberculosis, which is only one of the many diseases destroying thousands of lives annually.

The Association is not interested alone in the school child but in the teaching profession as well; and it does not stop there. It is interested in the health, strength, and working efficiency of every individual in the universe.

But for the present we must deal with the school child and those interested in its welfare.

The work of the Association is educational, and it employs the four greatest educational institutions—The Public School, The Public Press, The Public Platform, and The Motion Picture. The greatest of these is the Public School, and it is through the school child that we hope to accomplish most.

It is for this purpose that the Association has undertaken to establish dental clinics in the schools of the country.

The National body is not interested in the dental clinic except as an educational feature. The local auxiliary, on the other hand, is interested in both the educational feature and in the benefit that it will do the community.

The clinic cares for the indigent, dealing with the few. The National Mouth Hygiene movement must deal with all the people, the rich, the poor, and those of the middle class. All walks of life need mouth hygiene instruction.

Therefore, in the employment of the campaign for raising funds, the plan embraces a method and system which will bring to every individual in the community an invitation to become a part of and contribute to this great movement in the interest of the health, strength and working efficiency of humanity.

Working in the interest of the school child, we work through the school children and a message is carried to every individual in the city; and through them an invitation is extended to the individual to become a part of the great movement which has for its purpose the production of healthier and stronger American citizens.

The first move necessary to secure the co-operation of the National Mouth Hygiene Association in your local work is the formation of a local auxiliary to that body in your community.

In accomplishing this end the interested party will find in the early stages that the people most willing to co-operate will be the dentists, physicians and school teachers, and it is from these professions that the foundations must be secured for a successful local auxiliary.

Following the organization of the local auxiliary an application must be filed with the Secretary-Treasurer of the National body, requesting the installation of a publicity campaign in the community in which such auxiliary was formed. Applications will be filed and acted upon in the order received.

When the Association is ready to operate in any given community the preliminary publicity work will be directed by one of the officers of the National Mouth Hygiene Association, who will visit the city where the campaign is to be conducted in advance of the field Secretary, and it will be his purpose to arouse public interest through the newspapers, from the public platform, and in other educational ways.

That some definite idea may be had as to the manner in which the public interest may be aroused will say this official will cause bacteriological tests to be made in public places, such as school buildings, street cars, theaters, etc.

He will also make tests in the mouths of the school children, sterilizing mouths and then employing gauze masks, transferring the children and then exposing them in the various public places for the purpose of showing how quickly the sterile mouth may become infected and the various kinds of bacteria that will be found in these mouths after a few minutes' exposure in public places.

Following this will be a period in which the Association employs newspaper publicity. At this time the Association will send into the field a professional organizer, whose business it will be to raise the money to secure a clinic and endow it for an indefinite period of time.

The preliminary work that this organizer must do is to secure the support and co-operation of the health and educational authorities in the community. The co-operation and support of all municipal and civic organizations must be secured.

Following this the teaching profession of the community must be organized and their support and co-operation obtained. When this has been done we are ready to start with the financial campaign. This will cover a period of a week of active work.

It is utterly impossible for me to go into full details relative to the organizing and conducting of such a campaign. Let me say, however, that in addition to the solicitation of large contributions the local auxiliary, which has the work in charge, will endeavor to raise a large percentage of this money by waging the strongest kind of a campaign for membership; the dues to be turned into the general fund.

The membership in the local auxiliary is composed of two classes—"contributing members" and "working members". The first class is composed of those members who make contributions of $1.00 or more. The second class is composed of those who are not able to make financial contribution but are willing to devote a definite amount of time to the work of the Association in carrying out its plans and policies in the community.

To the latter class belongs the school child in whose interest the campaign is conducted. Working in the interest of the school child of the community the plan embraces, insofar as practical, the employment of the school children as workers in the field. The younger children will be used in the distribution of a booklet and other educational matter, making a strong appeal for support of the movement.

The booklet used will be entitled "The Cry of the Shackled Child; A Plea to Aid Mentally Crippled Children Whose Proper Development Is Held Back by Bad Teeth and Unhealthy Mouths." This booklet will contain a strong appeal that cannot fail to reach the heart and create a deep interest in the success of the work undertaken.

For the purpose of giving you some idea of the contents of a booklet of this kind I beg to quote the following extract, which is taken from the inside of the front cover:

> "This booklet has been placed in your hands by a school child. In justice to your juvenile friends and relatives, the least you can do is to read it.
>
> "Educators, clergymen, civic workers, city officials and all other public-spirited citizens have approved the movement it promotes.
>
> "At any rate, it will present some facts to you that will surprise you and take only a few minutes of your time in reading it.
>
> "In a few days you will be called upon to aid this great work by becoming a member of the National Mouth Hygiene Association's local auxiliary. You can help materially by giving the young solicitor courteous attention. If you cannot see your way clear to join the children, at least do not dishearten the child who calls upon you by an abrupt or harsh rebuff. He is working for humanity and certainly deserves encouragement."

This booklet explains fully the purpose of the campaign and the need of co-operation.

A day or two following the distribution of these booklets an older child calls soliciting membership in the local auxiliary, collecting the fee of $1.00, and issuing a membership card which, in addition to calling for educational literature, contains a coupon which, when presented at any drug store in the city, entitles the bearer to a full "dollar's worth of tooth toilet articles."

The booklet which has been distributed explains to the individual whom the child solicits, that the National Mouth Hygiene Association has placed in operation a plan which makes it possible for its local auxiliaries, that are conducting campaigns. to buy and place in the hands of their members packages of the highest grade of tooth toilet articles, which ordinarily retail for $1.00. and by the transaction be able to set aside 50% of the membership fees for the endowment and maintenance of dental clinics.

These membership packages contain four large tubes or boxes of tooth paste or powder, such as ordinarily retail at 25 cents per tube or box.

These "four-tube" or "four-box" packages are supplied to local auxiliaries in a manner which enables them to place same in the hands of the druggist at a cost of about 40 cents per package. The druggist is allowed 10 cents per package for reclaiming the membership coupons. This makes the "$1.00 membership package," delivered to the member, cost the local auxiliary 50 cents.

The new member for the $1.00 paid, receives a full membership in the local auxiliary and a "$1.00's worth of tooth toilet articles"; and by the transaction places in the hands of the local auxiliary the profit which otherwise goes to the manufacturer of tooth toilet articles. In this case the profit amounts to 50 cents on the $1.00 and is retained in the community and devoted to endowing and maintaining school clinics.

The National Association has also arranged a plan whereby the same tooth toilet articles may be supplied through the regular commercial channels on a basis which will enable the community to reap the benefit of the profit from such sales.

This is done by the placing in the carton of each 25-cent package a metal disc which, when collected by the local auxiliary, entitles that organization to collect 5 cents for each disc to be used in its local work, or in maintaining dental clinics.

The difference between the profit accruing to the auxiliary from the "$1.00 membership package" and the four 25-cent packages sold through regular trade, represents the difference between supplying large quantities to the local auxiliaries at cost and the commercial and overhead charges in handling these goods through the regular commercial channels.

This is a co-operative method which permits the people in a community to turn the profit that now goes to the tooth toilet manufacturers of the country into a local fund for the purpose of not only establishing school dental clinics and other clinics, but supplying tooth toilet articles to the poor of the community. Such a plan would enable these individuals to have at their command methods and means to care for themselves in a manner which would permit them to reap the benefits of healthy-mouth conditions and thus remove the possibility of their becoming a public menace through neglect or inability to care for the mouth properly.

In order to give some idea of the tremendous profit that accrues from the manufacture and sale of these articles, I wish to say that some of the leading manufacturers have been and are paying as much as from five to seven thousand dollars an issue for the back cover page of some of the most popular magazines.

I can readily understand that immediately within the mind of the skeptic or doubter there arises the question of graft or the attempt to advertise some tooth toilet article; but I wish to announce to the world at large that the plan has been drawn and safeguarded in such a manner as to make it absolutely impossible for any one associated with the National Mouth Hygiene Association or any of its auxiliaries to receive one penny of profit or graft from the transaction.

I wish also to state in the most emphatic terms that no manufacturer of tooth toilet articles is directly or indirectly interested in the promotion of this plan.

There are four things which have led to the adoption of the plan herein suggested:

First—The need of funds to carry on the work of the Association in the various communities.

Second—The success attained in raising funds for Y. M. C. A. buildings, hospitals, dispensaries, etc.

Third—The popularity and success attained in raising funds through the sale of Red Cross Stamps.

Fourth—The fact that the National Mouth Hygiene Association's campaign is unique in that every effort put forth to educate the public as to the importance of Mouth Hygiene creates a demand for tooth toilet articles.

In adopting the plan for supplying tooth toilet articles as herein outlined, the Association has combined the raising of funds and the supplying of a need and, it is believed, that this feature will become as popular and more effective than the Red Cross Stamp feature of the Anti-Tuberculosis League.

In conclusion let me say that the whole success of the plans and policies mentioned herein depends both upon the employment of thoroughly competent experts in the different lines of work and upon the presentation of the matter in a way which will convince the public that this is absolutely a philanthropic and economic proposition.

The National Mouth Hygiene Association has undertaken to do this work in the interest of humanity, and it guarantees that every step taken and every act committed will bear the most rigid inspection and investigation; for upon the honesty of purpose and purity of action must rest not only the success of the scheme but the good name of the Association and those associated with it.

FORTY-EIGHTH CONVENTION OHIO STATE DENTAL SOCIETY

HEALTH AND SCIENCE CONFERENCE

(*Continued from March* SUMMARY.)

DR. PRICE: The challenge of this hour is not self-sacrifice; it is self-appreciation. We have a part and privilege in a work, and the next speaker, Dr. McCampbell, will give us some idea of what we can do along that line. Dr. McCampbell, the executive officer of our much esteemed State Board of Health.

THE RELATION OF DENTISTRY TO THE HEALTH OF THE PEOPLE

BY E. F. McCAMPBELL, PH.D., M.D., COLUMBUS, OHIO
SECRETARY AND EXECUTIVE OFFICER, OHIO STATE BOARD OF HEALTH

It is needless for me to say that I fully appreciate the honor of speaking a few words to this distinguished body on "The Relation of Dentistry to the Health of the People," a subject which has been assigned to me by your most distinguished and gracious President. I trust that you will not think me unappreciative of this honor if I omit the rather ancient, worn and time-honored phrases which a medical man, invited to appear before another related, yet distinctly intelligent and scientific, body of this character, might be expected to pronounce.

The development of modern dentistry, I believe all will agree, has without doubt been due to the necessity which has been imposed and forced upon this profession by continual development of dental deterioration. Evidence is before us which would seem to indicate that the teeth of man are more prone to decay nowadays than in years past, because of our general irregular habits, and broadly speaking our modern modes of life and perhaps more particularly on account of the change to the general character of our food. We are aware that Nature engages in reconstructive processes after tooth decay only in a very limited fashion. In this particular alone are Nature's processes inimical to the perpetuation of the normal activity and the repair of the body tissues. In the realm of artificial repair lies the only salvation of man with decayed and degenerative organs of mastication.

I dare say we are all familiar with the relation of proper mastication to normal and healthy bodily activity. It is also well known to those who have carefully investigated the matter that the loss of teeth from dental caries is not to be regarded as an affair of little consequence. The individual's body is thus incapacitated and weakened because of the inability to properly perform the function of mastication. In addition the carious tooth may serve as a reservoir or a focus for various pathogens which when they enter other tissues of the body may produce very serious infections. Again, we must take proper cognizance of the effect of the reflex nervous disturbances, originating in carious or impacted teeth and the general detrimental effect on the body. It is of importance, therefore, that all teeth lost from one cause or another be restored as soon as possible by dental art in order that the denture may be made as nearly normal as possible, and in order that mastication of food may be performed properly. Marked progress has been made in the improvement of dental art. At the same time there has been developed a still more humanitarian field of work which is of decided importance to the public health worker and the sanitarian. I refer to the work in oral hygiene and prophylactic dentistry. The prevention of a disease is more important than the cure of a disease. In this general connection, permit me to quote from a paper read before the Columbus Dental Society a few weeks ago: "I do not anticipate that any remarkable discoveries or triumphs in the field of preventive medicine, including preventive dentistry, will be made which will assuage suffering and make the practice of medicine or dentistry less profitable. Physicians will continue for many years to treat the sick, and dentists will continue to fill teeth and supply bridges. However, at the same time there should be developed a still broader field of humanitarian activity for all physicians and dentists. The physician or the dentist will be engaged mainly in advising as to the means of preventing disease and in doing such corrective work as is proper. They will become the general educators of the public on all matters having for their purpose the protection of the individual and the public health and they will engage in all public health and social welfare work in the community."

Our citizens are beginning to recognize the importance of health conservation and to appreciate the fact that the fight for disease prevention is as important as the fight against animal and plant diseases and as practical and rational as the work of fire protection and crime prevention by means of police organization. "Hygiene will prevent more crime than law," says Münsterberg, and this is undoubtedly true.

The medical profession for many years has regarded itself as the only body of individuals capable of carrying on or directing the organized welfare work of the community, the state and the nation. Within recent years we have logically come to believe that such is not necessarily the case. This profession has been suffering with so-called introspective egoism in regard to the handling of quite a number of the more important social problems. We now regard the conservation of the health of the people as a communal problem. We regard the elimination of preventable diseases as social problems and hold the view that the occurrence of these diseases is due, largely at least, to social offenses for which the whole so-called body social may be held responsible. I think that humanity owes a great debt of gratitude not alone to the physician, but to the dentist, the educator and the social and philanthropic worker. An immense amount of constructive welfare work has been done by our right-minded citizens in recent years.

For many years past we have been going on in ignorance of the deplorable and unhygienic conditions which have been found to actually exist among our so-called civilized people, and many have been accustomed to ascribe the deleterious effects on the individual and the race to the action of Divine Providence. It is important to bear in mind that we know from the light of modern scientific research that neither the morbidity nor the mortality rates are fixed by the Almighty. We are all collectively responsible for the conditions which obtain. One of our most important problems is the education of the public in regard to the preventability of most of the diseases which have devastated the commonwealth and our nation for generations. Education is the general remedy which must be applied in combating all the problems of health. Our citizenship must be taught right and proper methods of living if we are to increase the general efficiency of the race and render oncoming generations more impregnable to disease. The future of the community, the state and the nation obviously depends upon the integrity of the people located within the respective confines. The perpetuation of the race depends upon the general intelligence and fortitude of our people.

It is important, therefore, that ways and means be devised for reducing preventable deaths and the preventable sickness which occur in our commonwealth and our country. Annually approximately 27,500 people die of preventable diseases in Ohio, out of a total of approximately 65,000 deaths. Again, annually in Ohio at least 130,000 people are ill from disease which modern science knows to be absolutely preventable, not taking into account the amount of dental caries which occur. It is rather difficult to estimate the financial loss to the state but it is within the neighborhood of $100,000,000 annually. We should also bear in mind in this connection the number of preventable accidents which occur, and the fact that the amount of dependency in the state and in the nation is increasing. It is easy to establish the connection between ill health and the occurrence of pauperism, feeble mindedness, insanity, and perhaps criminality and juvenile delinquency. It is also rather difficult to estimate what factor disease plays in such deplorable disasters as homicide and suicide. A careful analysis shows us that in most instances insanity, feeble mindedness and criminality result from defective heredity, together with defective environment. It should be remembered, however, in this connection, that education and environment have but limited influence over a body composed of defective protoplasm or a body in which there is a defective heredity. In Ohio today there are approximately 20,000 dependents which are being kept in state institutions. During the year of 1912 there were in Ohio 278 murders, 3,140 crimes against the person and 720 suicides. Statistics would seem to indicate an increase of at least twenty-five per cent. of all forms of dependency during the last century. It is well to remember also in Ohio there are about 5,000 blind persons, and at least one-half of them are blind because of preventable diseases. It costs the state of Ohio approximately $4,200 to educate a blind child. It may be stated in addition that those confined in the institutions of this state cost our taxpayers over $3.900,000 annually.

It can be readily appreciated, therefore, that the straight health problems, as well as those which are indirectly related, form a tremendous composite problem for solution by the citizens of our commonwealth. In order to successfully combat these problems, support must come from all professions, i. e., from the physician, the dentist, the educator, social and philanthropic worker, as well as from our educated and right-minded people of Ohio.

There is no question but that reforms in matters of hygiene and sanitation in the earlier periods were due to such general reasons as economic necessity, philanthropy, and possibly panic. Later as our scientific knowledge became more accurate and we became familiar with disease conditions as a result of accurate scientific investigation and research, very definite progress was made.

Our knowledge of dentistry and oral hygiene is based upon the results of accurate, scientific investigation. Oral hygiene, as one of the specialties of medicine, has received considerable attention in recent years, not alone from dentists but also from public health workers. Professional sanitarians are paying more and more attention to this important subject, realizing full well the importance and the relation of the oral cavity to health and disease. We are familiar with the fact that several associations for the consideration of oral hygiene have been organized and that the subject is also receiving much attention from the rank and file of the dental profession. The National Mouth Hygiene Association is probably the most active organization in this country for the promotion of this work. The state and national dental societies also have active committees on oral hygiene which are doing very important constructive work along these lines.

It is not necessary for me to discuss before a body of this kind the detail of the bacteriology of the oral cavity and the disease conditions which may result therein, which may materially impair the health of an individual. Neither is it necessary for me to discuss the effect of malposed oral structures and the effect upon the neighboring cavities and sinuses. Suffice it to say, that the relationship of all these conditions to health is fully appreciated by all those who have investigated the subject carefully.

Mention should perhaps be made of the important work which is being done throughout the country along the lines of the physical supervision of school children. Statistics show us that at least seventy-five per cent. of our school children are physically defective and that at least sixty to ninety per cent. are suffering from defective oral conditions. It is fully appreciated, I think, that physical defects of any kind interfere materially with the mental development of the child. We also know that physical defects corrected in childhood and early life may modify the entire subsequent life and career of the individual. The child on reaching adult life will be a more useful and constructive citizen if not burdened by physical defects. The work which is being done in the various schools of the country along the lines of improving the oral conditions of the children is well worth while. Some antagonism in this work is being developed in various sections. It arises largely, I believe, because of the misconception on the part of some of the parents as to just what is proposed. I think it well to emphasize the fact that the advocacy of the medical and dental inspection of school children is not an attempt to foist either of these professions upon the so-called ''unsuspecting public,'' but that the aim is to point out to them the presence of certain physical defects and to suggest to the parents that the child be taken to the family physician or dentist for the necessary corrective treatment, if such is possible. In indigent cases proper provision should, of course, be made for the necessary work by the proper authorities. Furthermore, I think it highly advisable for all workers along these lines to discard the term ''medical and dental inspection'' and to use the term ''physical supervision'' in place thereof. Less antagonism will be developed to the proposition I am sure.

It is important also that an increased amount of educational work be done along the line of the teaching of dental hygiene in the public schools. The school children must be taught the importance of a clean and healthy mouth, and the importance and the method of properly cleansing the teeth. Literature should be distributed on the subject and tooth brushes, and powders and pastes should be provided for all those unable to secure them.

A word should also be said in regard to the importance of the prophylactic dental care of prospective mothers. It is a well-known fact that pregnancy produces certain trophic changes, and that the teeth are, in many instances at least, very prone to decay during this period. As you know one of the big health problems in this state and nation is the prevention of the unnecessary infant deaths and sickness. In order to bring into the world an absolutely healthy child it is a matter of absolute importance that the mother be in the best physical condition. This is impossible if she suffers from defective oral conditions. The relationship of mastication to proper digestion and assimilation has been previously mentioned. The same remarks which have been made in regard to the necessity of the care of the mothers' teeth before the birth of the child may be applied and emphasized as being equally apropos, if not more important after the birth during the nursing period, when perhaps the major portion of the dental caries occurs.

It is interesting to note that an increasing amount of general prophylactic work is being done throughout the country, not alone among the pregnant, but among men, women and children generally. The general public is beginning to appreciate the importance of this work, I believe.

I have previously stated that the remedy for all our health problems rests in the education of the people. The State Department of Health believes that the people should be educated in regard to oral hygiene for the prevention of dental deterioration. The Ohio State Board of Health has on the road a public health exhibit which is being transported to various parts of the state. This exhibit carries with it charts, aphorisms, pictures, models and a complete stereopticon and motion-picture outfit. A part of this exhibit is devoted to the subject of oral hygiene. This section has been developed largely through co-operation with Dr. Homer C. Brown, President of the National Dental Association and a member of the State Board of Health, and Dr. E. W. Martindale, Chairman of the Oral Hygiene Commission of the Ohio State Dental Association and several members of the Columbus Dental Association. A lecture on oral hygiene is being given also in almost every place where the exhibit is located and a large amount of very helpful educational work is being accomplished. Following the exhibit a motion picture film which has been graciously donated by your distinguished body is shown with good effect. We have also been devoting considerable attention in the Monthly Bulletin, published by the State Board of Health, under my editorship, to the subject of oral hygiene. I am in favor of spreading broadcast among the citizens of our commonwealth the facts in regard to this subject.

The dental profession is making a marked contribution to the campaign for the conservation of the public health in the State of Ohio. The dentist, just the same as the physician, or the social worker, may become a wonderful factor in the work of social welfare in this state. The campaign is going on with the greatest energy at the present time.

Ohio is fortunate at the present time in having as the chief executive of the state a man who is intensely interested in the conservation of the life and health of our citizens; a man, if you please, who sees no value in injecting partisanship into humanitarian legislation; and if I might modify slightly the words of our distinguished friend, Dr. Vaughan, the Governor is also a man who, I am sure, believes that the most successful government is that which makes it possible for all its citizens, without discrimination or distinction, to enjoy the greatest length of life under conditions which will be most favorable for physical, mental and moral growth and development. The citizens of this state are to be congratulated that Governor Cox has taken such intelligent interest in public health matters and has, as I have previously stated, the welfare of the people truly at heart.

In conclusion I must emphasize the necessity of all the professions getting together for this important campaign. We must have the support of every right-minded and thinking citizen. The words of Sir William Osler are quite appropriate:

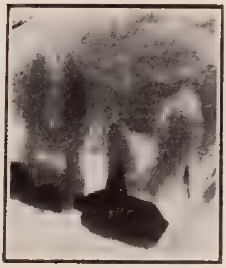
"By far the most dangerous foe we have to fight is apathy—indifference from whatever cause, not from a lack of knowledge, but from carelessness, from absorption in other pursuits, from a contempt bred of self satisfaction. Fully twenty-five per cent. of the deaths in the community are due to this accursed apathy, fostering a human inefficiency, which goes far to counter-balance the extraordinary achievements of the past century. Why should we take pride in the wonderful railway system with which enterprise and energy have traversed the land when the supreme law, the public health, is neglected? What comfort in the thought of a people enjoying great material prosperity when we know that the primary elements of life (in which even the old Romans were our masters), are denied them? What consolation does the 'little school house' afford when we know that a Lethean apathy allows toll to be taken of every class from the little tots to the youths and maidens?"

(Applause.)

A CASE IN PRACTICE*

BY DR. U. B. SHONTS, WALLA WALLA, WASH.

The first molar was under treatment for devitalization with arsenic when the patient was in his eighteenth year, and the tooth was filled with amalgam. The condition of the roots was unknown at that time beyond what is stated above. A year later the patient started in at dental college, and shortly thereafter a small, slow, inoffensive alveolar abscess appeared. During the next four or five years the tooth was more or less intermittently treated.



The conclusion the treating dentist and the patient dentist arrived at about that time was that pus had dissolved the lower half of the distal root of the tooth; also that there had been an abscess with a fistula so recently that at the time when the root was filled some of the chlora-percha used came out through the fistula. However, a crown was put on at that time, and has been doing active, vigorous, comfortable and efficient service for the past twelve years with but one day of soreness during that period.

The skiagraph was made after the crown had been on for twelve years.

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*Presented at the Meeting of the Northern Indiana Dental Society, 1913.

BUSINESS · SUGGESTIONS

Our readers are urged to send business suggestions for this department that there may be an exchange of ideas that will be mutually beneficial. Send all contributions to the editor,

L. P. BETHEL, 195 SIXTEENTH AVE., COLUMBUS, OHIO.

THE BUSINESS SIDE OF DENTISTRY

BY "A BUSINESS MAN"

THE DENTIST'S BANKING CONNECTION

It is advisable that every dentist make the personal acquaintance of the best banker in his city and transact all his business through his bank. A good banker stands high in the city in which he lives and it is profitable to cultivate the acquaintance of such a man and it will do any dentist a great amount of good. Neither the banker nor his family may ever give their entire business to one dentist, but by associating with a banker the dentist will derive great benefits.

It would be well for every dentist to consult his banker on all matters of business that are important. This advice will be invaluable and the business experience which the banker will impart will be very helpful.

All money transactions should be made through the bank by depositing all money taken in and paying all bills by check. It is good business and makes it easier to keep track of one's affairs and it has the added advantage of establishing one's credit at that particular bank.

Should an emergency arise where money is needed, one who has established his credit at the bank will have no difficulty in obtaining the desired accommodation if he has convinced his banker of his integrity and business ability. Such an accommodation may be worth very much by enabling one to take advantage of some unusual opportunity when it presents itself. The banker will know whether a dentist pays his bills promptly (and one always should do so), and a reputation for prompt settlement of bills is as desirable as abundant capital. Good credit is capital.

The banker knows many people and should be a safe man to consult concerning the standing of prospective patients who may want especial accommodations, and he is a man to whom one making inquiry concerning a dentist would be most likely to go. So, the favorable acquaintance of a banker might prove a valuable asset.

THE DENTIST AS A COLLECTOR

The collection of accounts is one requiring close, systematic, careful, persistent and tactful application.

As a matter of fact, there ought to be no necessity for the exercise of these various qualifications, for no one receiving credit at the hands of another should subject him to any annoyance and delay in the settlement of the bill. No matter who the debtor is, the bills should be paid promptly according to agreement. If this were done all the services required in an effort to collect bills would be eliminated. Credit is never extended to any man unless he has created the belief that he will pay according to agreement; and having received credit, no man should fail to do as agreed. When he does fail, however, there is no alternative but to exercise such means as will produce the desired result.

Abe Martin, the humorist philosopher, is quoted as saying: "By the time some fellers get ready to pay you, it's just like findin' it," and again just as tersely: "Every dog has his day, but the feller that pays is always popular." The unworthy debtor ought not be trusted, but his name is legion and one's only safety lies in depriving him of his unlawful gains. Some debtors have the erroneous idea that they are accommodating a creditor by taking his goods and again when they pay. Such are very apt to readily grant the first but defer the second as long as possible. Eliminate this class of debtors as much as possible. Find out before extending credit the character of the man asking it and his reputation for paying bills. There are enough good people who will pay to make it unnecessary to cater to the undesirable debtor. One cannot afford to run the risk.

A dentist, nor any other creditor, should be scared by the "bogey" which makes him afraid to ask for what is his due. A creditor should not apologize when calling attention to the fact that money has not been paid according to agreement and should have no hesitancy in reminding the debtor of that fact. A personal interview always counts for most, but even that is not always productive of the desired results, and when it is demonstrated that the debtor is of the class who evades his bills, the creditor usually has an uphill road ahead of him for a time. Usually, all of this could have been averted by proper investigation and understanding before the debt was incurred. Of course, there are occasions when the best of men are temporarily embarrassed, but rarely does a really good man develop a chronic case of "dead-beatitis." Under the most trying circumstances a good man will usually give evidence of his desire to do the right thing and will eventually do so.

There is no advice that I can give concerning the handling of the man who is always in debt and always delinquent except to keep after him diligently, persistently and yet tactfully. If diplomacy is required in any branch of business it is in prying money from that type whose custom it is to get all they can on credit and pay only what they are forced to. The best advice is: Eliminate as far as possible this type of patient and see to it that he in no way gets the advantage of you.

To sue an account should be the very last chapter in the effort to get money and only after every other means has failed. The man who has no regard for his own credit nor the feelings of the man who befriended him by extending credit is not worthy of continued consideration. So sue if you must, but get the money without if you can.

EDITORIAL

REFLEX ANESTHESIA

In this issue we publish a communication from Dr. W. J. Hogan, president of the Hartford (Conn.) Dental Society, relative to a new method of producing local anesthesia that has been discovered and is being developed by Dr. Wm. H. Fitzgerald, a Nose and Throat Specialist in Hartford, and we hope that our readers will peruse it.

Those who have witnessed the demonstrations given by Dr. Fitzgerald, are enthusiastic over the results and possibilities of the new method.

The method itself is simple. It consists of the use of a metal probe tipped with absorbent cotton (or thumb and finger of operator), which is applied with different degrees of pressure to nerve areas and causes anesthesia in the affected tissues. In November Dr. Fitzgerald gave the first demonstration of his method to the hospital staff in Hartford, performing several operations painlessly. The hospital physicians also performed operations painlessly after Dr. Fitzgerald had anesthetized the parts.

In January, Dr. Fitzgerald, by invitation, demonstrated in the presence of dentists. One patient had several teeth extracted without pain, and many tests were made to demonstrate the anesthetic effect of the method.

A friend of the editor's, in a recent letter, states that he was present with thirty-eight others the evening Dr. Fitzgerald gave the talk and demonstrated all that he claimed. Further, he states, that Dr. Fitzgerald was very modest. He allowed others to try their hand and they apparently succeeded equally well. Teeth were extracted and instruments were jabbed into fingers and hands, blood drawn and the victims declared that they felt no pain. One dentist, suffering from headache all the afternoon, was cured of his headache by the president of the Hartford Dental Society. Our friend goes on to say: "What gave me the most interest was not what the doctor did that evening, but the great possibilities as he perfects his method and knowledge. Several of the dentists here have had success in a number of cases and other dentists, treating cases of pyorrhea alveolaris, have been able to operate with no pain or annoyance compared with former experience, and the patients expressed themselves as much pleased."

Regarding Dr. Fitzgerald, our correspondent says: "Dr. Fitzgerald has been open and frank and wants everybody to know of the method and make the best use they can of it free and welcome. He has not pushed himself to the front, and so far as I know has been perfectly and frankly ethical."

All of which speaks well for the Doctor and adds weight to the reliability of what he has presented and the sincerity of its presentation.

The question is, to what extent can his method be successfully used by the dental practitioner, and time will demonstrate this.

To obtain a better idea of the method we wrote to Dr. Fitzgerald and asked him to kindly answer the following questions for the benefit of our readers, which he cheerfully did as follows:

Can you anesthetize as thoroughly by applying pressure on any portion of the nerve trunk as on the terminal ends?

Answer: Yes.

How long an application (in seconds or minutes) is usually necessary to obtain anesthesia?

Answer: From a few seconds to two minutes or longer. Dr. Hogan, who is in a better position to know than I am, says he averages one minute.

How long will the anesthesia last in the nerve?

Answer: From two minutes to as many hours.

How does the pressure cause the anesthesia?

Answer: We have our theories, but let us confine ourselves, for the present at least, to clinical facts.

To anesthetize certain teeth so that the dentist could bur out the cavity of decay without pain or with less pain, where would you apply the pressure? To the nerve as it emerges from some foramen, or on the gum?

Answer: Usually to the nerve as it emerges from a foramen. Some patients are so susceptible that firm pressure on gums with thumb and finger directly over or beneath the offending tooth is sufficient. Anesthetize gum by pressure or lip or cheek directly opposite tooth or teeth to be treated.

NEW PUBLICATIONS

Anatomy and Histology of the Mouth and Teeth. By I. Norman Broomell, D.D.S., Dean and Professor of Prosthetic Dentistry, Dental Anatomy and Histology, Dental Department, Medico-Chirurgical College, Philadelphia, and Philipp Fischelis, M.D., Associate Professor of Histology and Demonstrator in Embryology, Medico-Chirurgical College, Philadelphia. Fourth edition, revised. Price, *net*, $3.00. Blakiston's Son & Co., 1913, Philadelphia.

In the preparation of this work it was the aim to systematically describe those parts of human anatomy which come directly under the care of the dentist. The subjects treated are in general: Part I, a description of the mouth; muscular tissues of the mouth; lips, cheeks, soft palate, tongue; the bones of the mouth; temporomandibular articulation; general description of the teeth; occlusion of the teeth; the blood and nerve supply of the teeth; description of the upper teeth in detail; of the lower teeth in detail; the pulp cavities of the teeth; the deciduous teeth; etc. Part II, General cytology, general embryology and histogenesis. Elementary tissues; circulatory organs; mucous membrane of the mouth; other structures within the mouth; glands and ducts of the mouth; tissues of the teeth; embryology of the mouth and teeth; development of the teeth; anomalies of the teeth. In this edition there has been added a comprehensive description of the present status of our knowledge of blood and lymph. A comprehensive description of the structure of the circulatory apparatus. A general consideration of the structure of various forms of glands. In addition to these features the subject matter of the various chapters has been rearranged to conform with the general plan of the work. The subject is presented in a concise and attractive form, fully illustrated with mostly original illustrations, those in the one chapter on the development of teeth requiring about one hundred dissections for their preparation.

Elementary and Dental Radiography. By Howard Riley Raper, D.D.S., Professor of Roentgenology, Operative Technic, Materia Medica and Therapeutics at the Indiana Dental College, Indianapolis; past Dental Surgeon to the Indiana School for Feeble-Minded Youths; member Institute of Dental Pedagogics, local, state and national dental societies; associate member A.M.A., Section of Stomatology. First edition. Consolidated Dental Mfg. Co., New York; C. Ash, Sons & Co., Ltd., 1913, London.

The author states that the object of this book is to teach: First, the elementary principles of radiography; second, special dental radiography. The first part of the book is written in such a way that it can be used as a guide by any one who wishes to take up radiographic work. The second part of the book is devoted to dental radiography and is of interest mainly to dentists, and specialists in radiography who do work referred to them by dentists. It gives in detail the special technic involved in the practice of dental radiography, also a chapter with one hundred and eighty-three half-tone illustrations, demonstrating sixty-four uses to which the radiograph may be put in the practice of dentistry. The text is well written, and profusely illustrated. The book is one that every dentist should have in his library.

Operative and Dental Anatomy Technics. A classroom and Laboratory Manual for Freshmen Dental Students. By W. H. O. McGehee, D.D.S., M.D., Professor of Operative and Prosthetic Dentistry and Superintendent of Clinics in the Ohio College of Dental Surgery; formerly Dean, Professor of Dental Pathology, Therapeutics and Materia Medica and Demonstrator of Dental Technics, Department of Dentistry, University College of Medicine, Virginia, etc. P. Blakiston's Son & Co., 1914, Philadelphia.

While the book was written primarily for the use of his own classes the author believes it will also meet the needs of teachers in other schools. Chapter I treats of dental anatomy, how to study it; how to perform the technic operations; how to review for examination. Chapter II, instruments and appliances. Chapter III, preparation of cavities. Chapter IV, filling materials. Chapter V, the treatment of pulps and the opening and filling of pulp-chambers and canals. Chapter VI, suggestions to the teacher and technic course suggested by the author. The book contains 207 pages, is concisely written and amply illustrated.

Dental Diseases in Relation to Public Health. By J. Sim Wallace, D.Sc., M.D., L.D.S., formerly Dental Surgeon and Lecturer on Dental Surgery, London Hospital, London. Published by The Dental Record, Alaston House, Newman Street, W. London, England, 1914. Price 3/, *net.*

The three communications which go to make up this little book are a report on Dental Diseases in Relation to Public Health at the recent International Medical Congress, a discussion on Dental Hygiene in Infancy and Childhood, at the annual meeting of the Royal Sanitary Institute at Exeter, and a discussion on Children and Dental Disease before the State Medicine Section of the British Medical Association, 1912. The author says these communications are now published together in order to try to bring home to physiologists and others the importance of a knowledge of the physiology of oral hygiene, a subject which, notwithstanding its overwhelming importance at the present day, is altogether neglected in text books of physiology. The book contains much instructive material that the physician and dentist and their patients can read with profit.

Pyorrhea Alveolaris. By Friedrich Hecker, B.Sc., D.D.S., A.M., M.D., member of the Academy of Science of St. Louis, Mo.; Consultant at Bell Memorial Hospital of the School of Medicine, University of Kansas; Consultant at St. Margaret's Hospital, Kansas City, Mo. C. V. Mosby Company, publishers, 1913, St. Louis. Price, *net*, $2.00.

The author maintains that pyorrhea alveolaris is the result of constitutional and exciting causes, which lower the vital resistance of the alveolar process, gum, and the peridental membrane, rather than a purely local process. The author looks upon pyorrhea alveolaris as a disease that is more disastrous and farther reaching in its results than commonly supposed, but he looks upon the disease as one amenable to treatment. The subject matter given is as follows: Varieties of Pyorrhea, Technic of Making Blood Smears, Stains, Culture Media. Bacteriology. Pathology. Technic for Making Vaccines, Collecting Blood Corpuscles, Vaccination, Making Capillary Pipettes. Local and Prophylactic Treatment. The book contains 160 pages of text and 32 illustrations, the majority being original, and the paper, printing and binding are excellent. (Copies may be ordered from THE DENTAL SUMMARY.)

Lecture Notes on Chemistry for Dental Students. By H. Carlton Smith, Ph. G., Lecturer on Physiological and Dental Chemistry at Harvard Dental School; honorary member of American Academy of Dental Science, of the Metropolitan Society, of Massachusetts State Dental Association, of Harvard Dental Alumni, and Northern Ohio Dental Association. Second edition, revised and enlarged. John Wiley & Sons, publishers, New York, Price, $2.50, *net*.

Chemistry furnishes the groundwork of all branches of medical science to a much greater extent than we are apt to think, and even in the study of subjects which in times past has been carried on with little reference to chemistry, we now see the desirability, if not the necessity, of a good general knowledge of chemical science. This work, containing 400 pages of text, brings to the reader a vast amount of information. The matter is not treated as is usual in books on chemistry, but includes Qualitative Analysis, Dental Metallurgy, Volumetric Analysis, Microchemical Analysis, Organic Chemistry, Physiological Chemistry, Digestion and a chapter on urine. The author states that this second edition is an almost new book, using the first edition as foundation only. The chapter on Organic Chemistry has been considerably enlarged. A number of new cuts, about ninety pages of text and eighty-five experiments have been added and the arrangement has been changed with the purpose of making the book useful to any teacher of dental chemistry. The laboratory work follows closely the outline of lectures.

Anatomy, Descriptive and Applied. By Henry Gray, F.R.S., Fellow of the Royal College of Surgeons; Lecturer on Anatomy at St. George's Hospital Medical School, London. A new American from the eighteenth English edition. Thoroughly revised and re-edited, with Basle Anatomical Nomenclature in English by Robert Howden, M.A., M.B., C.M., Professor of Anatomy in the University of Durham, England. Lea & Febiger, 1913, Philadelphia and New York.

Gray's Anatomy is familiar to all dentists. It is probably the most popular text-book in use. The outstanding modification in the text of this edition is the use of the Basle nomenclature. Except in a few instances this nomenclature has been adopted in its entirety, and in most cases English translations of the Latin terms are employed. The paragraphs on Surface Anatomy, which in previous editions were appended separately to the descriptions of the various structures, have been collected and recast into a special chapter, which admits of more easy reference. The section on Histology has been shortened. The elementary tissues are described in it, but the complex tissues are considered along with the organs to which they are specially related. The whole text has been thoroughly revised and, where necessary, rewritten. About two hundred new engravings have been added, making the total illustrations, 1,126. A glossary exhibiting the three accepted nomenclatures in parallel columns will be found a great convenience. The table of contents is so arranged as to give a complete conspectus of anatomy, a feature of obvious value. As a teaching instrument the new Gray's Anatomy embodies all that careful thought and unstinted expenditure can combine in a text book.

SOCIETY·ANNOUNCEMENTS

The Sixth International Dental Congress, London, England, August 3-8, 1914

The Sixth International Dental Congress will be held in London, England, August 3-8, 1914. The committee appointed by the National Dental Association having in charge the affairs of the Congress relating to the United States have selected the following to take part in the Congress program:

ADDRESSES

Dr. J. H. Burkhart, Batavia, New York, to deliver the address on behalf of the National Dental Association at the opening session.

Dr. Edward C. Kirk, Philadelphia, Pa. Address before the general session, the afternoon session of the opening day. subject, “The Tendencies in Dental Education.”

SECTION 1—DENTAL ANATOMY, HISTOLOGY AND PHYSIOLOGY

“The Evolution of the Human Dentition,” Dr. I. N. Broomell, Philadelphia, Pa.; “Calcification,” Dr. A. R. Starr, New York City, N. Y.; “Chemistry and Physiology of Saliva,” Dr. Edward C. Kirk, Philadelphia, Pa.

SECTION 2—GENERAL PATHOLOGY AND BACTERIOLOGY

“The Etiology of Dental Caries,” Dr. B. Holly Smith, Baltimore, Md.; “The Etiology and Pathology of Pyorrhea Alveolaris,” Dr. Percy R. Howe, Boston, Mass.; “Pathological Conditions of the Dental Pulp.” Dr. R. W. Bunting, Ann Arbor, Mich.; “The Pathology of the Antrum,” Dr. Charles H. Oakman, Detroit, Mich.

SECTION 3—DENTAL SURGERY AND THERAPEUTICS

“Inflammatory Diseases of the Gingival Margin and Peridental Membrane Pyorrhea Alveolaris,” Dr. T. Sidney Smith, Palo Alto, Cal.; “Restorations of Lost Portions of Tooth Substance by Inlaying,” Dr. R. Ottolengui, New York City, N. Y.; “Oral Sepsis in Relation to General Disease,” Dr. C. N. Johnson, Chicago, Ill.; “The Prevention of Oral Sepsis by Treatment,” Dr. J D. Patterson, Kansas City, Mo.

SECTION 4—DENTAL PHYSICS, RADIOGRAPHY AND METALLURGY

“The Uses and Advantages of X-Rays as an Aid to Diagnosis, Including the Differentiation of the Radiography Appearances of Normal and Abnormal Tissue,'' Dr. Howard R. Raper, Indianapolis, Ind.; ''The Structural and Other Changes Arising in Connection with Metals Used in the Mouth,'' Dr. Clarence J. Grieves, Baltimore, Md.; ''The Theory and Practice of Pressure Casting,'' Dr. Weston A. Price, Cleveland, Ohio.

SECTION 5—GENERAL PROSTHESIS

''Articulation and Articulators,'' Dr. J. H. Prothero, Chicago, Ill.; ''Design and Retention of Partial Dentures,'' Dr. H. J. Goslee, Chicago, Illinois.

SECTION 7—ORAL SURGERY AND SURGICAL PROSTHESIS

''The Late Results of Cleft Palate Operations,'' Dr. Truman W. Brophy, Chicago, Ill.; ''The Treatment of Dental and Dentigerous Cysts,'' Dr. Wm. Carr, New York City, N. Y.; ''Surgical Prosthesis of the Jaws,'' Dr. M. C. Smith, Lynn, Mass.

SECTION 8—ANESTHESIA—GENERAL AND LOCAL

''Gas and Oxygen. Alone, in Mixture and in Sequence for the Extraction Operation,'' Dr. Charles K. Teter, Cleveland, Ohio; ''Gas and Oxygen Analgesia for Conservative Operations,'' Dr. Thomas B. Hartzell, Minneapolis, Minn.; ''Local Anesthesia With Special References to (a) Methods (b) Drugs (c) Sphere of Usefulness (d) Contra-Indications and Dangers,'' Dr. Eugene R. Warner, Denver, Colorado.

SECTION 9—ORAL HYGIENE, PUBLIC INSTRUCTION AND PUBLIC DENTAL SERVICE

''The Effects of Dental Treatment on National Health and Physique,'' Dr. Herbert L. Wheeler, New York City; ''Prophylaxis at Different Ages,'' Dr. A. R. Melendy, Knoxville, Tenn.; ''Lantern demonstrations of slides showing (a) Means of affording public instruction in dental hygiene, e. g., lecture material, charts, etc. (b) Photographs of school dental clinics, institution for public dental service for adults or other institutions in which public dental treatment is being carried out,'' Dr. Wm. A. White Phelps, New York.

SECTION 10—DENTAL EDUCATION

''Methods of Teaching Orthodontics to Dental Students,'' Dr. S. H. Guilford, Philadelphia, Pa.

The following have been selected as Honorary Presidents of the Sections:

Section 1—Dental Anatomy, Histology and Physiology, Dr. Mathew H. Cryer, Philadelphia.

Section 2—Dental Pathology and Bacteriology, Dr. Thomas B. Hartzell, Minneapolis, Minn.

Section 3—Dental Surgery and Therapeutics, Dr. Edward S. Gaylord, New Haven, Conn.

Section 4—Dental Physics, Radiography and Metallurgy, Dr. J. P. Buckley, Chicago, Ill.

Section 5—Dental Prosthesis, Dr. D. O. M. LeCron, London, England.

Section 6—Orthodontics, Dr. Roscoe A. Day, San Francisco, Cal.

Section 7—Oral Surgery and Surgical Prosthesis, Dr. J. D. Patterson, Kansas City, Mo.

Section 8—Anesthesia, General and Local. Dr. Thomas P. Hinman, Atlanta, Ga.

Section 9—Oral Hygiene, Public Instruction and Public Dental Services, Dr. Herbert L. Wheeler, New York City.

Section 10—Dental Education, Dr. Henry W. Morgan, Nashville, Tenn.

A list of essayists and clinicians will be published later.

The committee invites the ethical members of the profession of the United States to become members of the Congress. Membership, which includes admission to the Congress sessions and a copy of the proceedings, is $7.50 and for members of their families accompanying them $3.75.

Dr. Herbert L. Wheeler, 560 Fifth Avenue, New York City, has been appointed by the committee to arrange for steamship rates, sailing dates, itinerary, etc. Those desiring to attend the Congress, sailing with the American delegation, immediatedly following the meeting of the National Dental Association, Rochester, N. Y., July 10, 1914, are requested to correspond with Dr. Wheeler.

Committee {
TRUMAN W. BROPHY, *Chairman,*
WM CARR,
S. H. GUILFORD,
WALDO E. BOARDMAN.

BURTON LEE THORPE, *Secretary,*
3605 Lindell Blvd., St. Louis, Mo.

Anglo-American Exposition, London, (May to October), 1914

To Celebrate the Centenary of Peace and Progress in the Arts, Sciences and Industries of the United States of America and the British Empire

As one of the principal objects of the *Anglo-American Exposition*, which will be held in London during the coming summer, is to celebrate the one hundred years of peace between Great Britain and the United States and to further insure the continuance of that peace by affording means for the people to become better acquainted, and to increase the commerce between the people of the two countries, a Commercial Club, composed of American and British manufacturers will be organized in connection with the Exposition.

The meeting place of this club will be a headquarters for trade information and the interchange of ideas relating to commercial matters, and we beg to request that you place the club on your complimentary mailing list for two or more copies of your publication issued, while the Exposition is open, from May to the end of October.

We desire to afford to exhibitors and others attending the Exposition the means of acquainting themselves with all valuable trade information in which they may be interested, and we believe the opportunity to see your publication will be highly appreciated by the members and visitors to the club.

Trusting to have your co-operation in this matter as well as in others to make the Exposition as helpful as possible to manufacturing and commercial interests.

Faithfully yours,
ALBERT E. KIRALFY,
Commissioner General.

American Executive Offices:
Woolworth Bldg., New York City.

Michigan Licentiates Please Notice

In compliance with Section 5 of the Public Act No. 183 of 1913, which is as follows:

> Every registered dentist shall, on or before the first day of May of each year, except the one in which he is registered, pay to the secretary of the board of dental examiners, a license fee of one dollar. The year for which a fee shall be paid shall begin on October first, following the May when it becomes due, and end the succeeding September thirtieth. In case any person defaults in paying said fee, his license may be revoked by the board of dental examiners, on thirty days' notice in writing from the secretary, unless within said time said fee is paid.

Notices will be mailed to all dentists registered in Michigan to their last known address, on or before April 15th, 1914. Failure to receive such notice will not be an exemption or an excuse for non-payment. In such cases all persons should notify the secretary, giving their correct address. This also applies to all those living outside the state.

Respectfully,
F. E. SHARP, *Sec'y.*

Port Huron, Michigan.

South Carolina State Board

The next annual meeting of the South Carolina State Board of Dental Examiners will be held at Chick Springs, South Carolina, beginning Friday, June 12th, at 10 o'clock A. M.

Examinations are theoretical and practical on regular college branches. Applicants must furnish instruments and material for any demonstrations called for by the board. Applicants must exhibit diploma from reputable dental college before being registered for examination. For further information address

R. L. SPENCER, *Sec'y.*,
Bennettsville, S. C.

Wisconsin State Board of Dental Examiners

The Wisconsin State Board of Dental Examiners will convene in Milwaukee at Marquette University on June 22d, 1914, at 2 o'clock P. M. for examination of applicants to practice in Wisconsin.

High school diploma, application and $25.00 fee to be filed with the Secretary fifteen days prior to above date.

Dental diploma to be presented in advance of the examination.

Junior dental students presenting a clear card for two years' unconditional work from a reputable dental college and filing a high school diploma, or its full equivalent, will be permitted to participate in the theory examination in the following six major subjects: Anatomy, physiology, histology, chemistry, bacteriology, materia medica. The grades made in these subjects will be credited at subsequent examinations.

Special application blanks for this examination and $10.00 fee, together with high school credits to be filed fifteen days in advance.

F. A. TATE, *President*,
W. T. HARDY, *Sec'y.*,
1404 Majestic Bldg., Milwaukee, Wis.

Pennsylvania State Board of Dental Examiners

The next regular examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday and Saturday, June 10, 11, 12 and 13, 1914. Application blanks can be secured from the Department of Public Instruction, Harrisburg. For further information address the secretary,

ALEXANDER H. REYNOLDS,
4630 Chester Ave., Philadelphia.

Arkansas State Board of Dental Examiners

The next meeting of the Arkansas State Board of Dental Examiners will be held at the Marion Hotel in Little Rock, Arkansas, on June 8th and 9th.

Application and fees should be filed at least ten days prior to date set for examination.

For future particulars address

I. M. STERNBERG, D.D.S., *Secretary*,
Merchants Nat'l. Bank Bldg., Fort Smith, Ark.

South Dakota Board of Dental Examiners

The next regular semi-annual meeting of the South Dakota Board of Dental Examiners will be held at Sioux Falls, South Dakota, on Tuesday, July 7th, 1914, at 1:30 P. M. Applications for examination must be made before July 1st. For blanks and further particulars apply to

ARIS L. REVELL, *Secretary*.
Lead, South Dakota.

North Carolina State Board of Dental Examiners

The next regular meeting of the North Carolina State Board of Dental Examiners will be held at Hendersonville, N. C., beginning promptly at 9:00 A. M. on Monday, June 22, 1914. All applications must be in the hands of the secretary not later than June 15th.

For further information and application blanks address the secretary.

DR. F. L. HUNT, *Sec'y*,
Asheville, N. C.

New Jersey State Board of Dental Examiners

The New Jersey State Board of Dental Examiners will hold their regular meeting and examination in the Assembly Chamber of the State House, Trenton, N. J., on June 29th, 30th, and July 1st, 1914. Applications must be filed *complete* at least ten days prior to date set for examination. No interchange of license. License fee, $25.00.

"All applicants for a license to practice dentistry in New Jersey shall present to said board a certificate from the Superintendent of Public Instruction showing that before entering a dental college, he or she, had obtained an academic education consisting of a four years' course of study in an approved public or private high school, or the equivalent thereof." Therefore, the secretary will issue application blanks to applicants *only* upon the presentation of the required dental certificate from the Superintendent of Public Instruction, Trenton, N. J.

A bridge, consisting of three or more teeth, exclusive of abutments, and one Richmond Crown, metallic parts in gold, will be required mounted and articulated, as a practical test in Prosthetic Dentistry, in place of a full set of teeth soldered upon a gold or coin silver plate hitherto required.

For further particulars, apply to Alphonso Irwin, D. D. S., Secretary, 425 Cooper Street, Camden, N. J.

Montana State Dental Society

The Montana State Dental Society will meet in Great Falls, Mont., June 11th, 12th and 13th. All ethical dentists are invited. For further particulars address J. W. ADAMS, *Secretary*.
Billings, Montana.

Michigan State Board

The next meeting of the Michigan State Board of Dental Examiners will be held at the Dental College, Ann Arbor, commencing Monday, June 15th, and continuing through the 20th. For application blank and full particulars address F. E. SHARP, *Sec'y*,
Port Huron, Michigan.

"Rochester Loves Company".

The 1914 session of the National Dental Association will be held in Rochester, N .Y., July 7th to 10th, 1914. The local committee has selected the Powers Hotel as headquarters and have made the other necessary arrangements for a large attendance.

This is the first meeting of the Association under the reorganization and the House of Delegates, the governing body, will meet at 10:30 A. M., July 6th.

The officers and committees are expecting to present an exceptionally interesting program, the details of which, together with the other arrangements, will appear in the later Journals and the next number of our Official Bulletin.

HOMER C. BROWN, *President*,
Columbus, Ohio,
OTTO U. KING, *General Secretary*,
Huntington, Indiana.

Ohio State Dental Board

The Ohio State Dental Board will convene in Columbus on June 16th, 1914, for examination of applicants to practice in Ohio.

Applications must be in the hands of the secretary June 6th.

H. C. MATLACK, *President*,
19 W. Seventh St., Cincinnati,
HOLSTON BARTILSON, *Secretary*,
150 E. Broad St., Columbus.

National Dental Protective Association

The annual meeting of the National Dental Protective Association will be held in Washington, D. C., May 19th, 1914, at the Dental Department of George Washington University at 7:30 P. M. for the election of trustees and transaction of business.

E. P. DAMERON, *President*,
M. F. FINLEY, *Secretary*.

Northern Ohio Dental Association

The fifty-seventh annual session of the Northern Ohio Dental Association will be held at the Wigmore Coliseum, Cleveland, Ohio, Thursday, Friday and Saturday, June 4, 5 and 6.

C. D. PECK, *Secretary*.

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Iowa State Dental

The fifty-second annual meeting of the Iowa State Dental Society will convene at Des Moines, Iowa, May 5, 6 and 7, 1914, beginning Tuesday, May 5th, at 9:00 A. M. Elaborate clinics and lectures and a large exhibit will be presented.

Further information will be furnished upon request from ethical practitioners of other states contemplating a visit to the meeting and to whom we extend a cordial invitation.

Exhibitors desiring space should apply to Dr. W. J. Cameron, Des Moines, Iowa.

C. M. KENNEDY, *Sec'y,*
Des Moines, Iowa.

New Jersey State Dental Society

The forty-fourth annual convention of the New Jersey State Dental Society will be held at the North End Hotel, Ocean Grove, N. J., July 15th, 16th, 17th and 18th, 1914.

The hotel is situated on the beach front at the foot of Wesley Lake, within a few feet of the Asbury Park Casino, and within a block of the Asbury Park trolley. The meetings will be held in the hotel, while the entire second floor of the pavilion will be devoted to clinics and exhibits. The pavilion is over the ocean with plenty of light and every chance for the cool sea breezes to blow through. A bridge over the boardwalk connects the hotel and pavilion making this an ideal arrangement for a convention.

An attractive meeting is being arranged and a cordial invitation to attend is extended to all ethical dentists.

JOHN C. FORSYTH, *Sec'y.*

Dr. M. H. Fletcher is Dead

Cincinnati, Ohio, March 26—Dr. M. H. Fletcher, known all over the world as one of the foremost practitioners and instructors in the dental profession, died here today of cerebral hemorrhage.

This sad intelligence reaches us too late for an adequate obituary in this issue. In our May number an effort will be made to pay proper honor to the memory of an able scholar, a sterling citizen and a cultured gentleman.

IN MEMORIAM

EDWARD M. NEY

TREASURER OF THE J. M. NEY COMPANY

DIED SUNDAY, FEBRUARY EIGHTH

ONE THOUSAND NINE HUNDRED AND FOURTEEN

AT HARTFORD, CONN.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXIV MAY, 1914 No. 5

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The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

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L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

RETROGRESSION OF PROSTHETIC DENTISTRY*

BY E. E. QUIVEY, D.D.S., FORT WAYNE, IND.

IN DISCUSSING THE SUBJECT at hand, "The Retrogression of Prosthetic Dentistry," I do not presume to assert that retrogression has spread to all its branches. I refer only to that quite-despised and much-abused branch designated as plate work; and to say that the standard of efficiency of this branch has declined may seem upon first thought and in the face of modern equipment and greatly improved facilities, to be a wild and unfounded theory.

I beg to assure you, however, that the belief is not born of mere fancy, but is the result of careful and extensive investigation; and I am fully convinced that the percentage of dentures giving satisfactory service, and of scientific and artistic construction, was materially greater twenty-five years ago than it is today.

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*Read before the Northern Indiana Dental Society, 1913.

I make this admission reluctantly for it is a sad commentary upon the integrity of the profession that such a condition prevails; and it is incumbent upon the profession, through its colleges and societies, to correct this evil (for an evil it is) and bring this branch forward to the high plane of proficiency occupied by other departments of the profession.

It is not so much my purpose here to suggest a remedy as to demonstrate the need of it; but incidentally, I shall cite what, in my opinion, are the causes which have brought about this state of retrogression.

The men in practice twenty-five years ago were not handicapped by the limited experience in plate work as are those whose only experience is that afforded in their collegiate course; as, theretofore, it was the custom to spend from two to four years in the office of a preceptor before going to college, if, indeed, they went to college at all.

When those men studied dentistry there were no public mechanical laboratories; thus necessity compelled all practitioners to make their own plates; and plate work was a much greater factor in the sum-total of a dental practice than it is today. That was before the advent of crown and bridge work and countless partial plates were made to meet such demands as are now supplied with bridges.

Every office had a vulcanizer always in working order and in almost daily service. Every phase and feature of plate work was encountered in the constant work of supplying plates ranging from one tooth to full dentures for mouths of every sort and description. Naturally, from this large and varied experience a thorough knowledge and a high degree of skill was acquired.

At that time other departments of dentistry had not advanced to a degree that detracted from the interest in plate work; and proficiency in plate work was quite essential to success, as the reputation of a dentist was dependent in no small measure upon his ability in that line. But a revolution was at hand, a revolution destined to cause a decline rather than an advance in this line of work.

With the advent of crown and bridge work, interest in plate work began to wane; and in the wild scramble to adopt and master a new department and educate the public to new modes and methods plate work was relegated to the background. Its importance was lost sight of; it lay dormant, so to speak; the various little details essential to fit, comfort and expression were neglected. Gum sections, so splendidly adapted to many cases, because more tedious and difficult of construction, fell into disuse to the extent that the mechanical precision and artistry of construction, common among dentists twenty-five years ago, has well-nigh become a lost art.

With the loss of interest we began to breed antipathy for this line of work. Plates were made in a perfunctory way, much as we would perform an unpleasant duty, impatiently and indifferently. A decided decline in the character of the work came with the hurry-up, hap-hazard methods of the five-dollar plate makers; and I doubt not that retrogression was in a measure due to the reduction of prices. For in all lands and in all lines good pay is an incentive to good service—yea, essential to honest labor. And to the same extent that we owe it to our professional honor and to humanity to raise the standard of service, we owe it to our professional dignity and to those dependent upon us to raise the standard of prices to a plane commensurate with high professional service.

The dislike for plate work, already wide-spread and intense, was aggravated by the lowering of prices and when the teeth-without-plates method came into vogue, we went bridge crazy; and it was at least found highly remunerative, if not justified in any other way, to swing big bridges to two or three elongated teeth which had already contributed their full measure of usefulness. We made a lot of bridges that have since become painful to memory; they arouse belated sympathy for the victims and smite the conscience for its transgressions.

This must not be accepted as a condemnation of bridge work; I have no criticism to offer of bridge work where it is indicated. What I may say of other departments is simply incidental to my appeal for better plate work.

I do not think there is any department of practice in which we encounter more complex and intricate situations; yet there are many so indifferent to this line of work as to leave it almost wholly in the hands of an office girl or a cheap laboratory man of limited experience and utterly incapable of producing results which even approach the possible point of attainment. In fact, many dentists seem to so underestimate the importance and possibilities of denture making as to regard it as a sort of necessary evil, a thing to be tolerated but not seriously considered. The belief that artificial dentures are of little value and but poor excuses at best has been accepted to the extent of having become a popular fallacy.

Let me relate a few incidents in support of this statement. One young man told me that a short time before he graduated he said to a member of the faculty, "I don't believe I know as much about plate work as I should," to which the professor replied, "oh, well, you will get that with a little practice; when you have made a few plates you will know as much as most dentists do about plate work." Another young man told me that when he had finished his specimen plates he dropped the lower one and broke it. He took it to the President of the college who said, "that is unfortunate, but you repair it and what seems a misfortune may prove to be an advantage for it will show to the board of examiners that you know how to repair a plate." "Well," said the young man, "I sneaked away in utter humiliation, for I didn't know how to repair the plate, but, fortunately, my room mate had had two years of office experience and he turned the trick for me." Another man told me that when he got out of college he went into partnership with an old practitioner and that he was amazed to discover that there was real art and science in plate making and that he was also chagrined that he knew so little about it. But, to quote him literally, "thanks to the patience, indulgence and kindly interest of that old man I found both interest and satisfying results in the pursuit of a line which, but for his kindly offices, would ever have been a bug-bear.'' At the Ft. Wayne Dental Depot last spring I met a dentist from over in Ohio who told me that he had a fifteen-year-old boy in his office who did all of his plate work. Some days later I chanced to meet another dentist from the same town and he told me I would not doubt it if I could see some of the plates he turned out. A prominent dentist in one of our Indiana cities said, ''I can't afford to bother with plate work when I can teach a boy how to do it in thirty days and can hire him for five dollars per week.'' He must be a phenomenal teacher and they must have phenomenal boys in his neck of the woods. Furthermore, he is probably satisfied with any old thing that bears a remote resemblance to a set of teeth.

But why try further to prove a condition which is evident everywhere? Do we not hear plate work belittled, reviled, denounced and condemned on every hand? Yes, and it is wrong, wrong, wrong; it is but the prevalence of an erroneous idea, a fallacy running wild. It is a department which, by a careless lapse of interest, we have allowed to degenerate. A good artificial denture is of real value and of great service, and I have never known a man who had mastered the art and science of plate work decry it; in fact, such men testify that the pursuit of this branch of our work is quite as fascinating as that of any other, and the results fully as gratifying.

The science of denture making among us is the most backward and dragging and the least scientific of any department of our profession. We ought to wipe the dust off our prosthetic spectacles and start a series of plate-work revivals, or resort to some other radical means to remove the blemish that mars this line of our work. We cannot get away from plate work any more than we can get away from the tax collector; neither can we escape its responsibilities any more than we can escape the grim reaper, death. Plate work is the rock upon which the dental profession was founded and will ever remain one of the pillars of its maintenance.

There are more artificial teeth being manufactured than ever before, and more are being sold than ever before; consequently, there must be more dentures being made than ever before. Then, by every process of reasoning, does it not follow that we should be more proficient in the work than ever before? We have greatly improved facilities for doing the work, an almost endless variety of moulds and shades and the wonderful advantages given us by the modern system of anatomical articulation, and I am pleased to say that I believe the best of our present-day denture makers are far superior to the best of any other period. But, I am not using the experts as a basis of comparison; I am speaking of the rank and file, of which I am one, and that element of the present suffers by comparison with the rank and file of the practitioners of twenty-five years ago.

With some of the present-day practitioners I believe the trouble is more the result of indifference than inability. I think I may illustrate the point I wish to make more clearly by relating an incident which recently came under my observation. Last summer I went to visit a dentist friend, and I have always considered this man an excellent plate workman. I had not been there long, however, until I saw and heard things which led me to suspect that he had developed a dislike for plate work. My suspicions were confirmed on the second day of my visit, when he came into his laboratory with an impression which he had just taken. He said that it did not suit him, but finally decided that it was pretty fair. He said his patient was a bad actor and that he was in a hurry, so he guessed he would let it go at that. Now, right there that man slipped a cog in his moral convictions and in his professional honor, as well. He was trying to justify himself in doing a thing that he knew in his heart of hearts could not be justified. An impression that is only pretty fair is of no more account than the hole in a doughnut. Impressions, like eggs, are either good or bad. Excuse me from "pretty fair" eggs, and impressions as well.

I know men who labor faithfully, patiently and cheerfully to accomplish results in other departments of practice, but who develop a grouch embodying all the characteristics of a sordid nature when engaged in denture making.

This disposition is not inherent in these men; it is the result of struggling with a line of work which is discouraging and odious because they have neither mastered it nor comprehended its possibilities. I assure you, gentlemen, that in this plate work department, the dental profession has a sick child, sorely in need of parental care. It needs a tonic of attention and a stimulant of understanding.

I commend any dentist for his earnest efforts to preserve the natural teeth, and the profession is to be most heartily congratulated upon progress in this department which is little short of marvelous; but, that does not condone the retrogression of plate work. You may preserve or restore the beauty of a refined and charming young woman with a master bridge or a faultless crown, and I grant you, you have performed a great service; but, when, in after years, the mission of the bridge or crown has been fulfilled, you supply this refined and charming woman, now old and careworn perhaps, with faultless dentures which add time and comfort to her declining years, have you not performed a service as great and as much to be commended as when you made the master bridge or the faultless crown? That I submit to your professional honor.

We should not lose sight of the fact that the filling, the crown and the bridge patients of today will be the plate patients of tomorrow; then can any dentist excuse himself for rendering service in this department one whit below the highest possible degree of proficiency, any more than he can excuse himself for inferior service in any other department of practice?

Some of the men with whom I have discussed the subject have been inclined to lay a large share of the blame at the door of the mechanical laboratory. With this inclination, however, I am not in accord. To the busy dentist, the laboratory is a godsend; to the lazy dentist a haven of rest, and who could have the hardihood to deny this element of their constitutional longing? But, seriously, the laboratory is an established institution; it is a flourishing auxiliary of the dental profession. And, because of the wide-spread custom among dentists of sending out their work, the laboratory has become indispensable.

But, does it follow that a dentist needs but a superficial knowledge of this department because the bulk of the work may be done in a laboratory a hundred miles away? May the dentist expect satisfactory results if the preparation of the case, which is his part of the service, be performed in a perfunctory way? No, my friends, it is quite as essential that the man who sends his work away should be as competent and as conscientious as the man who does it all himself.

In denture making every case has an individuality of its own; every patient has characteristics peculiar to that particular patient, and in the preparation of a case these conditions should be clearly shown and minutely described, else the laboratory man, who has no knowledge of the conditions, has little chance to meet them.

The beauty, comfort and convenience of a house lies not with the carpenter who does the work, but with the architect who supplies the plans and specifications. Neither does the beauty, character, expression nor service of a denture lie with the laboratory man, but with the dentist who supplies the plans and specifications, so to speak.

This brings to my mind a call I made at a laboratory in Chicago several years ago, and while talking with the manager I asked if in most cases they got good impressions, bites and other points and instructions sufficient to form a comprehensive idea of the requirements of the case. He gave me a quizzical glance and a weary smile as he picked up a box which had just arrived by mail and said, "Well, here is an average case. We will open it and you may judge for yourself." The box contained impressions for a full denture, a biscuit bite and a brief note of instructions. The impressions, I would say, were very good; the bite was unmarked except by a perpendicular line indicating the center; this line, however, could not have accurately indicated the center because of a great excess of wax in front of the ridge on one side of the mouth. The note was substantially as follows: "Make up enclosed case with Justi shade No. 6." You will note that the only thing specified was the color. The laboratory man was left to guess at everything else and if he proved to be a good guesser it is possible that that patient got a fairly good set of teeth, but it is probable that the patient paid for a set of teeth and got a mouthful of junk.

There is no guess-work about denture making. There are a few well defined and imperative principles to follow and, with reasonable mechanical skill, if these principles were generally and carefully observed, a decided improvement in this department would soon be visible.

Can you imagine Joseph Richardson, P. G. C. Hunt, Samuel T. Kirk, Isaac Knapp, Robert Van Valzah, E. J. Church, Seneca B. Brown, T. A. Goodwin, F. Marion Burkett and hundreds of others who might be mentioned, submitting a guess-work case, such as I have described, to a laboratory for construction? No, indeed, unless you have a very elastic imagination.

Let me tell you of a step backward, paradoxical as it may seem, which would be a mighty stride forward. That would be to go back to the modes and methods, the principles and customs of our professional forefathers, then, with the aid of modern equipment and improved facilities, this department could be brought to a point of proficiency astounding to every doubting Thomas, a revelation to every skeptic.

But, as I said in the beginning, it is not my purpose to provide a remedy; that I shall leave to the wisdom of the more profound, to the colleges and societies. The application of the remedy must be left to the interest and to the energy of the younger men for they are to be the beneficiaries.

DISCUSSION.

Dr. J. A. Dinwiddie: We have just listened to a paper which I am sure should awaken the dental profession to the likelihood of its falling far short of the ideal.

While I cannot agree with all that the essayist has said, yet I want to thank him for writing such a paper at this time, and am sure that it is just what we need to arouse interest in plate work.

I cannot think it possible that in the light of our present knowledge this statement, that we are retrogressing, is true. To my mind, and the present knowledge of anatomical articulation, I cannot agree that we are one bit behind the operator who is placing inlays in position where in former years he placed foil fillings, for the prosthesist of today who is trying to give his patients the best service is using up-to-date methods and scientific methods. Where would we be today, if it had not been for Bonwill, Walker, Christenson, Gysi and Prothero? It is to these men we should bow and show our appreciation.

The colleges are equipped with better teachers on prosthetic dentistry, are teaching newer ideas, and this cannot be appreciated by men of the profession who have not kept up and in touch with the college work. There have been wonderful strides made in the last five years and I cannot think that we are retrogressing. If this statement had been made ten or fifteen years ago, I should have said it is so. One might just as well say that there is retrogression in foil fillings, which perhaps may be true.

I will agree with the essayist that the five-dollar plate man has caused havoc; yet, there is the one-dollar gold filling man who is in the same boat and of the same caliber. Yet, we do not think that operative dentistry has retrogressed; no, nor prosthetic either.

Bridge work has been abused, and if we would only look at the failures, we would say that it was retrogressing, but it is not so. The men who are trying to do the best for their patients are doing better work under improved methods.

The essayist cites cases where the dentist will give the laboratory work over to a boy or girl to take care of and are dilatory. This could have been said five or ten years ago, but it is looking better to me all the while.

I agree with the essayist that plate work revivals would be a grand thing and we are having them all over the country and they have been enthusiastic for the past five or six years.

As to laboratories, I am glad to know that some of them are trying to render good service, and sending out literature to help the dentist, enabling him to do the work properly, up to the point where they (the laboratory) can take it up and finish. The last five years have seen some wonderful changes in the laboratories; their up-to-date methods enable them to do better service, and I am glad to see that they are employing men that are competent to carry on the work.

I want again to thank the essayist for his paper and trust that it arouses a new enthusiasm so that he will see that prosthetic dentistry has not retrogressed.

The man that makes his plates for five or ten dollars does not give the same care as the man who charges from ten to fifty dollars. Neither does the man who makes an alloy filling involving two or more surfaces of a tooth and charges from fifty cents to a dollar give the same service as the man who restores the contact point, makes a perfectly smooth cervical margin and polishes his filling and charges from two to five dollars for his work. Yet, we see hundreds of mouths which are in dreadful condition owing to the fact that we have the fifty-cent filling and no contact point.

We have no more five-dollar plate makers than we have four-dollar crown makers or fifty-cent filling men, but they are only giving the fifty-cent service, while all over this broad land of ours we have men that have persistently been placing in the five-dollar filling and the fifty-dollar plate, and is a good working man and delivering the goods. The five-dollar plate is not as good as the fifty-dollar plate, nor is it giving the same service. The fault is the dentist and not the system, and again prosthetic dentistry is not the least scientific of any department if we do it as we are now taught, but it is the most scientific.

Dr. Roy L. Bodine: If I had heard this admirable paper two or three years ago, I would have agreed with it in its analysis of the greatest shortcomings of our profession; for, at that time, there would have been no possible defense. But I believe there has been a change in conditions since that time—a decided change for the better. I honestly believe that the present trend in this branch of prosthetic dentistry is not downward, but is upward.

While, of course, the results in the way of improved dentures are not as yet manifest to any appreciable degree, and will not be noticeable for some time to come, still, the first step has been taken, interest has been aroused, and men of standing are coming to realize that there is such a thing as a scientifically-constructed denture. With that accomplished, the contest is nearly won; for when any man, of the ability necessary to successfully perform the many other operations required of a dentist, makes up his mind that he wants to construct his dentures in the modern way, it will not be long until he is doing it. The steps are so simple, so rarely mastered, and follow one another in such perfect order that only laziness or indifference or a mistaken idea of their difficulties would prevent their adoption.

Only in one particular do I differ seriously from our essayist and that is his statement that the commercial laboratory should be held blameless for this retrogression. Practically all of the radical changes in dental practice have come about through the activities of the commercial interests allied with the profession. The investigators have made the discoveries and the inventions; but there are few new processes in dentistry which may be adopted without the purchase of some sort of an outfit, hence, the man with something to sell has been the means of distributing the ideas through the profession.

I think no man who will be honest with himself will dispute the statement that the greatest educative force in the profession today is the supply-man. Manufacturers, dealers and salesmen have done more to disseminate new ideas through the dental world than magazines and societies put together. Men like Drs. Bonwill, Snow and Prothero made the greatest discoveries in this line, and deserve all the credit due the scientific investigator; but, the number of their converts was pathetically small until a wide-awake dental manufacturer took up the cause. And you will all admit that the greatest force in our world for improved dentures has been the Dentists' Supply Co.

Now, stop and think where the dental laboratories have stood. Have you heard of any of them making any effort to improve the conditions which they all criticise and deplore? Are any of them making any effort whatever to educate the general practitioner to better work in the branch in which they delight to advertise themselves as specialists? I have here a recent offering of one of our largest laboratories. "Devote your time to the office and let us do your laboratory work. Just send impression and bite, and state color of teeth desired, we will do the rest." Now, which way is the force of that ad directed—for progression or retrogression? How much effort do you suppose the Chicago gentleman, whom the essayist mentions, has made to better the conditions of which he complains?

Just stop and consider what the result would be if the laboratories of the country would make a fraction of the effort towards improved dentures that the Twentieth Century people have made and then decide if they are to be held blameless for present conditions.

Gentlemen, you have the remedy for the whole situation in your own hands. Whenever your desire for improved dentures becomes so strong that you demand them, you will get them, and I believe that time is close at hand.

Men who have been getting good fees for dentures, simply because they have a large practice, are coming to realize that unless they give their patients anatomically perfect dentures, they are not earning the fees they receive, and are not deserving the confidence of their patients. They come to them expecting to receive the very best in dentistry, and unless they give them dentures with which they can properly masticate their food and by its proper preparation for digestion maintain their physical condition unimpaired they are not doing what they pretend.

To those who think they cannot afford to give this kind of service for the fees they are now getting, I can only say that the only way to get good fees is to earn them. No class of patients gets such poor service as plate patients, and none tries so hard to find satisfaction. None are so loud in their praise of the man who provides them with satisfactory substitutes for the organs they have lost, and it is easy to increase the fees for this work after you have mastered it. Just try it and see.

Dr. R. R. Gillis: I have nothing to say unless it be a confession. Plate work probably had retrogressed in my office, but I was awakened about a year ago, and since then I have been making an effort to get up to where I should be in plate work. I believe it is coming, but it is not here yet.

Dr. Henshaw: I enjoyed Dr. Quivey's paper very much. It is a beautifully composed paper, and Dr. Quivey is exactly right in the most of his statements. I believe he has hardly made sufficient allowance for the rebound that Dr. Dinwiddie and Dr. Bodine have suggested as taking place. There is no doubt that at the present time there is a swing of the pendulum back in the matter of prosthetic dentistry. I am sure that my personal observation has brought this very strongly to my mind, and I am very sure the time is coming when we will have not only good artificial dentures as we had them in the past, but far better, for the reason that they will be more scientific, thanks to the research work of such men as Prothero, Snow, Gysi and the rest of those fellows who are real scientists in this matter. I am not in the least inclined to take the optimistic view in this matter. I think we are coming to a better day, but I am perfectly willing to admit we have been through an exceedingly bad day.

The faults in the construction of the dentures we have seen have been so many and so lurid that it makes one ashamed to confess that he belongs to a profession that produces such atrocities. Though I am exceedingly hopeful of the future, I am not exceedingly hopeful of the present generation, myself and the fellows of my generation. It is hard to regenerate the older men. It is hard to teach an old dog new tricks. The men who entered the dental profession at the time I did were not imbued with the necessity of the high class of skill that is absolutely essential to the production of proper artificial dentures, but the new generation, the generation in the last five years, is necessarily our hope. The boys that are coming out of the colleges now are being trained properly, not only in the necessity of artistic and carefully-fitted dentures, but the necessity of useful dentures. I very sincerely believe and hope that within the next few years the present generation that is coming along now will not only restore prosthetic dentistry but will have advanced it far more than our forefathers ever dreamed of. I thank you.

DR. QUIVEY (closing): I don't know that there is anything that I might add. I wish to say, however, that I have nothing to retract. I stand by my guns. As I said in the paper, I have arrived at these conclusions as a result of extensive investigation, and if those who question some parts of the paper should read the correspondence I have had on the subject, I don't believe they would question any part of it.

I do not believe that Dr. Dinwiddie exactly understood my intention in the paper. I intended to give due credit, and I think I did, to the best of the present-day plate workers. I said I was pleased to admit they were far superior to any of the plate makers of the past; that I was not making my comparison upon the experts, but using the rank and file and I repeat that I firmly believe that the percentage of first-class plates turned out twenty-five years ago was greater than that turned out today. I do not believe you will find a man, if he has been observing, but what will sustain me in that statement; in fact, I have never talked to one, either old or young, but what said they believed the percentage of plates turned out today was of inferior quality compared to those turned out twenty-five years ago. There is not one bit of evidence I have collected, and I did it fairly and I did it impartially, and I did it with the hope that I might sustain the position that the percentage of plates was better now than then, but the preponderance of the evidence is the other way. I do not believe if any one could read the fifty or more letters I have received and could understand the talks I have had with the different men they would dispute one sentence of that paper.

One laboratory man told me a great many impressions came there without bites; simply impressions with instructions to make up a set of teeth. That is being done, and it is a common thing. I have had letters from laboratory men, and laboratory men have told me they have had impressions sent to them without the bite, and very often without the shade being given. They say in nine cases out of ten they do not give the bite. They do not know anything about how far apart they should be without the bite; they do not know whether it is right or wrong, whether it is close together or whether it is far apart. There is no measurement given whatever; nothing. They have to use their own judgment. I never knew a man in practice twenty-five years ago to take an impression without taking some measurement of the distance between the jaws, and almost invariably he would mark the distance of both the lower one and the upper one. A laboratory man told me that is almost an unheard-of thing. They do sometimes. Every laboratory man tells me they have a few that send them very comprehensive cases, but the vast majority of them are sent in without the instructions necessary to make a scientific denture.

I believe, in fact I am sure, that the best of the present-day denture makers are superior to those in any period of the past, but I do not retract the statement that there was a larger percentage of plates of scientific and satisfactory construction twenty-five years ago than there is today. There are a good many good plate makers and they give their patients better satisfaction than ever before, but, as a matter of course, if they have mastered the art, they are going to give them better plates. We haven't got to it yet, and we have got to go some before we produce a percentage of dentures as satisfactory as the plate workmen made twenty-five years ago.

All mechanical laboratories are not open to the charge of carelessness made by some of the discussers of Dr. Quivey's paper. Here are some of the requirements imposed by at least one such, they are worth reading.—Editor.

* * *

OUR REQUIREMENTS

Of course, no Laboratory, however well organized and equipped it may be, can do more than properly fit the models prepared and sent in by its patrons; and this part of the work should be given the most conscientious care by the dentist. It is in this part of the work that the duty of the dentist to his patient should be ably and amply fulfilled.

Take a plaster impression, and indicate on wax the central line and length. If air-chamber is wanted, so specify; also state the color of rubber, and every other detail that you want us to observe.

When the teeth have been set up, the case should be returned for try-in, and both fit and articulation verified before the completion of the work.

Teeth will not be ground until after the case has been tried and returned to us, unless all risk is assumed by the dentist.

An extra charge will be made to cover time and labor involved when shade of teeth is changed from the original order.

We cannot be responsible for plates made over compound impressions, nor from bites, when plates are not tried in the mouth before finishing.

HIGH-PRESSURE ANESTHESIA*

BY W. T. JACKMAN, D.D.S., CLEVELAND, OHIO

HUMANITARIAN DENTISTRY, or dentistry as nearly painless as it is possible for human skill and ingenuity to make it, is a theme I rejoice to write and talk about; but words would fail me were I to attempt to describe my satisfaction and delight in the practice of such dentistry. Does some one ask, "can the practice of dentistry be made practically painless?" YES, and I would capitalize every letter of that word. Indeed an affirmative answer to that interrogative cannot be made too emphatic.

And now, Mr. President, before entering upon the direct subject assigned to me, permit me to request each intelligent listener, after he has heard the papers of the evening, together with the discussions, to ask himself this question: "Dare I ever again drill into a sensitive tooth when I know there are such splendid pain preventive means at my command?"

As the most of you know I am such a great lover of the so-called high-pressure method for painless cavity preparation that to me it is *summum bonum*, the *ne plus ultra* of all the painless methods known to date.

Inasmuch as my paper is expected to be short I shall confine myself to the methods of using the syringe itself.

Nine cases out of ten the patient, so far as sensation is concerned, need not know that you are obtunding the tooth.

In describing my method of using the syringe I cannot do better than quote from a paper the speaker read at the meeting of the National Dental Association March 30th, 1909, at Birmingham, Alabama, the title of which was "The Elimination of Fear in the Practice of Dentistry."

This paper is intended to be helpful more particularly from the practical side; therefore I shall endeavor to describe to you in simple terms the procedure that will produce the desired results, viz., the complete obtunding of the tooth, in order that cavity preparation may be made painlessly. Let me say, by way of parenthesis, that there are many high-pressure instruments on the market, but there are, as far as I know, but two or three that are really efficient.

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*Read before the Cleveland Dental Society, 1913.

Let us select, if you please, the typical nervous patient with the blue-white teeth that are always sensitive. She comes to the office with fear depicted on every feature, and often we note the tremor of the whole body because of the never-to-be-forgotten previous operation or operations; or perchance it may be her first visit to the office, but fear controls her because she has heard others relate their experience. Let us prepare a cavity or cavities for this young woman of sixteen or eighteen summers. As previously stated, her fears must be allayed, as far as possible, by assuring her that you will not hurt her. After this proceed to adjust the rubber dam, if the teeth and gums do not need prophylactic treatment. Before adjusting the dam, however, a very important procedure should never be neglected, viz., desensitizing the gums with a five-per cent. aqueous solution of cocain hydrochlorate. This should be applied for at least five minutes, by grasping a piece of cotton with the pliers, dipping it in the solution and saturating the gum margin, using considerable pressure around the teeth over which the dam is to be placed. Then adjust the dam and proceed as follows, if the tooth to be operated on is a lower right first molar containing a large occlusal and a medium-sized buccal cavity: With a No. 3 round bur make a slight pit in the enamel, over healthy dentin, one-third the depth of the enamel; this pit should be made on either side of the buccal cavity or preferably just below the buccal cavity, if possible. Then use a No. ½ round bur to slightly deepen the pit already made, but do not drill through the enamel, for this would give needless pain. By running the engine at low speed the operation so far has been without pain. The tooth is now ready for the high-pressure syringe. The syringe I use has forceps handles with a locking device between the handles so that when complete contact is established in the pit with the point of the syringe and the handles closed as far as possible, they remain locked, thus relieving the hand and preventing cramp. Previous to applying the syringe, fill it with a two-per cent. aqueous solution of cocain hydrochlorate by placing the point in the solution and opening the handles; this will fill the barrel. Then grasp the handles, dagger fashion, stand behind and to the right of the patient, pass the left arm around the patient's head, place the second, third and fourth fingers of the left hand under the patient's mandible near the chin with the index finger of the left hand against the tooth to be operated on, for counter pressure. Pass the barrel and point of syringe, after filling, through the flame of the alcohol lamp to warm the solution. Then place the point of the syringe in the previously prepared pit, press slightly, then close on the handles; if perfect contact be made the handles cannot be closed far. Remember that perfect contact is not always possible, but the tooth is being obtunded, as to rapidity, just in proportion as the contact is relatively perfect.

We have now come to the point in the operation when the utmost care must be taken for, with tremendous pressure, water with cocain in solution is being forced into a live tooth. At this point some definite rule must be followed to be successful—no haphazard guesswork will do. The rule is to count by seconds. This knowledge is readily acquired by the study of the swing of the pendulum of a time-regulator; exercise this knowledge in using the syringe. On making the first application thirty seconds is usually required, when perfect contact is obtained, to force the solution through the remaining third of the enamel and a little way into the dentin, which may now be entered with the No. ½ round bur without giving the slightest pain. Then drill through the enamel with the No. 3 round bur. This is done in order that the continued pressure of the syringe may not craze the enamel. In a patient of this age and temperament continue the pressure for one and a half minutes longer, or ninety counts. If there has been perfect contact of the syringe in the pit, or, in other words, if there has been no leakage and the pressure caused by closing the handles has been as great as possible, the pulp will probably have been sufficiently obtunded so that the cavities may be prepared without pain. If, however, there is any sensation, use the syringe a few counts longer, but be very careful not to over-use it. Here is where the careful operator will succeed and continue to succeed, and conversely, the careless operator will fail and continue to fail until in disgust he will conclude that the method is a failure, never dreaming that he, and not the method, is causing the failure.

Let us not forget that even if nothing but water be used in the syringe, it is not difficult to force enough into the pulp chamber in a comparatively short time to strangle the pulp by pressure and thereby cause its death. But our obtunding solution is water plus cocain. Cocain is said to be a protoplasmic poison.* This is true when a high percentage is used. Several articles have appeared in our dental journals in the last four years against the use of cocain by the high-pressure method, because the claim is made cocain is a protoplasmic poison. So is strychnin a protoplasmic poison when given in overdose. What would the neurologist do in certain forms of neuroses if he did not have strychnin to depend upon as the sheet-anchor? To be sure, he does not give it in poisonous doses but when given in 1-120 to 1-60-gr. doses it becomes a nerve tonic rather than a poison. I cannot say that a cocain solution of a strength of two per cent. or less acts as a true tonic when forced into the pulp, and here

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*"Cocain is a strong protoplasmic poison, paralyzing all cells with which it is placed in contact * * * Local application paralyzes nerve cells, fibers, and endings. Sensory nerves are the most sensitive, so that cocain acts as a local anesthetic * * * It produces a local vaso-construction at the place of application * * On systemic administration it causes an irregular but on the whole a descending stimulation and paralysis of the entire central nervous system."—Sollman's "Pharmacology," 1906, p. 212.

the analogy fails, but I do claim, after almost five years' clinical test, that I have no proof that it acts destructively on the pulp tissue, but on the contrary, I am sure that I have observed fewer cases of necrosis of the pulp in the last five years under anesthesia produced by high pressure than in any previous five years. There are, I believe, two reasons for this: First, when the pulp is anesthetized it receives no "shock" from cavity preparation—but notice, please, that if great care be not used it may be injured by heat generated by running the engine too rapidly while cutting with the bur, particularly if the bur is not removed frequently, although at the time the pulp does not respond. Second, it receives little or no "shock" from malleting, for as a rule it does not recover fully until after the operation has been completed.

Reverting to procedure, some one may ask, "Do you always get perfect contact in applying the point of the syringe to the pit?" In quite a large percentage of cases I do not, yet if we get some pressure, in that proportion, as previously stated, we are accomplishing the work. Some patients are fidgety, and in working on the mandible it is often difficult to get perfect adaptation because of its instability. When one becomes accustomed to the use of the instrument the securing of contact, although it is the most difficult part of the operation, becomes comparatively easy.

For the removal of pulps, use the instrument half as long again as for cavity preparation. This rule must of necessity be a general one, for the condition of the pulp is always a factor in determining the length of time the syringe should be used. The greater the congestion of the pulp the longer the time required. If congestion has reached the stage of stasis it is impossible to anesthetize by this or any other method. Do you always succeed in obtunding with the high-pressure syringe? This is a pertinent question. The answer is, yes and no. I never expect failure and rarely do fail; but occasionally we find a tooth with curly dentin; in such a case, if the pulp cannot be reached at one angle, it may oftentimes be reached from another. Occasionally we find the teeth of an aged person to be very sensitive. Such teeth are usually difficult to obtund, because the dental tubuli are almost obliterated. These two classes are the only ones I ever have any trouble with, when the pulp is in a healthy condition.

These, then, are three advance steps taken in the elimination of fear: First, in the adjustment of the rubber dam; second, in cavity preparation, and third, in pulp removal three of the most painful operations in dentistry, if made in the old way.

You will have noted that I have presented this plea for a more humane practice of dentistry without superfluous technical verbiage, circumlocution, or rhetorical flourish. It has been stated in plain, simple language so that all who hear and read may understand, and with the one thought in mind that *means are available* for practically painless dentistry.

In conclusion, if you would succeed with the high-pressure syringe, carefully observe the following rules:

First—Never use it in a carious cavity, mainly for two reasons—because *(a)* the mouths of the dental tubuli are filled with debris, therefore you will not be likely to succeed, and *(b)* if you do succeed in desensitizing the pulp you will probably force ptomaines into it which will be almost sure to cause its death later. If it does not die, it will probably give the patient trouble for which the cocain will get the blame.

Second—Always enter the tooth from some surface point, for by so doing you will have a definite idea as to the relative distance to the pulp. This knowledge is imperatively requisite, for when you recall the case of my patient here you will remember that much more time is required to get the desired result than if you were entering a lower incisor at the gingival line.

Third—Age and temperament must be carefully considered, particularly as to the time required for desensitizing. We know that the dentinal tubuli and pulp in young patients are much larger than in aged ones, therefore much less time is required to obtund their teeth. This is particularly true of the nervous and bilious temperaments as compared with the sanguine and lymphatic. The danger of injuring the pulp by the use of cocain, as suggested above, is so remote that the ultra-conservatism which prevents its use spells injustice to the patient.

Schofield Building.

SIMPLE AND UNIQUE WAY OF RESTORING BROKEN-DOWN ROOTS WITH GOLD OR PORCELAIN CROWNS*

BY DR. M. B. WEST, PARSONS, W.VA.

I take my broken-down root and prepare it as for filling, fill top with amalgam, making gold band fit top perfectly and attach to Davis crown in usual way. Molars are treated likewise. Molars or bicuspids, which are not broken down, are treated in like manner; attach gold cusp swaged, or cast by casting machine, and attach in usual manner.

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*Clinic at West Virginia State Dental Society, 1913.

THE WAY I MAKE OPEN-FACED CROWNS*

BY DR. W. W. REYNOLDS, WESTON, W.VA.

I cut the pattern one-third longer than the tooth that has been prepared for a crown; then with collar shears I cut out the labial and lingual surfaces; then bring each end together and unite with 20 K. solder; then fit the tooth, attach the lingual surface and have patient bite on same, then complete.

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*Clinic at West Virginia State Dental Society, 1913.

A COMPARATIVE STUDY OF METHODS OF EXPANSION OF THE DENTAL ARCH RELATIVE TO THE MECHANICAL PRINCIPLES INVOLVED.

BY HERBERT A. PULLEN, D.M.D., BUFFALO, N. Y.

THE NEEDS OF A GENERAL practitioner of dentistry along the lines of orthodontic teaching is a subject upon which there is no doubt a variety of existing opinions, and the essayist trusts that in his presentation of one phase of orthodontic instruction especially prepared to satisfy perhaps one of these needs there may result a compensating measure of helpfulness to those earnestly seeking after a solution of some of the mechanical problems in orthodontia.

For the dentist without special training in orthodontia who elects to practice this specialty in connection with his dental work, the writer has a special message in this essay, which, in its elaboration, may possibly suggest the desirability of a deeper study of elementary principles as an aid in the practice of orthodontia.

Let us for a moment compare the work of the trained orthodontia specialist with that of the dentist electing to do orthodontia but having no special training, in order that by such comparison the status of the dentist untrained in up-to-date orthodontic methods may be more clearly shown, and his especial need in orthodontic instruction made more evident.

The specialist in orthodontia, because of the special training he has received, conforms his practice to well-established, practical methods of treatment, his increasing experience enabling him with greater facility to discard the innumerable useless appliances pictured in the older textbooks, and oftentimes in the current dental journals, and thus avoid the pitfall that many a dentist has fallen into, viz., the treatment of an impossible case with an impossible appliance.

Again, in the exclusive devotion to his specialty, the orthodontist has time to study the difficult problems of diagnosis, prognosis, and treatment, and to master the details of a constructive and operative technic that is ever ready to slip away from one who is not mastering it in daily practice.

On the other hand the dentist without special training in orthodontia, attempting to treat malocclusion, is seriously handicapped because of his lack of the modern teaching of the theoretical and practical principles of the science of orthodontia, and his efforts are largely experimental and usually inefficient.

Furthermore, with a large clientele demanding dental services, the dentist has not the time to make himself proficient in a special line of work which demands serious study for a considerable period of time.

Strange as it may seem there are many dentists who still select an obsolete or inefficient appliance for treatment of malocclusion. Within the last month a dentist explained to me that he was going to use an inclined plane to move out an upper incisor from inlock; a case recently came to me wearing a simple roof plate which the dentist had inserted for expanding the arch; another case presented with a roof plate tied in with silk ligatures for retention, the patient being instructed to renew the ligatures every few days; another case exhibited a jackscrew across the arch for general expansion; patients have come into the dental office with removable appliances in their pockets, or having lost the appliance in a haystack or on a football field apply to the dentist for a new appliance, which he has probably made a number of times before under similar circumstances.

Again, the operator who has read something of the possibilities of the expansion arch, yet not being sufficiently instructed in its use, applies it to a case with the belief that the power of the screw is pre-eminent, turns up the nuts on the arch and produces a long narrow dental arch; or from a lack of knowledge concerning the proper amount of expansive force to exert, has destroyed the anchorage completely by moving the molars into buccal occlusion.

In view of these conditions it must be admitted that. if the specialist always has the advantage of special training, experience, and the exclusive practice of orthodontia, the general practitioner without these qualifications will always be at a disadvantage in practicing orthodontia in connection with his dental work.

This disadvantage is exhibited in a lack of sufficient knowledge of orthodontic principles, which results in a lack of good judgment regarding not only the selection of efficient appliances for the treatment of malocclusion but also in the manipulation of a chance selected efficient appliance.

Now, it is evident from this that the general practitioner, if he elects to do a certain amount of orthodontia, should either look to the specialist for advice in regard to cases in orthodontia or should fit himself by careful study to handle the simpler cases of malocclusion according to well-established modern methods with a proper understanding not only of the laws of occlusal restoration, but of the involved mechanical principles, the basis of which are the laws of physics and dynamics.

With the supposition, however, that the simple laws of occlusion are in these days understood by the average dentist, this essay will be confined to the broad field of mechanics in orthodontia. which has been more or less confusing to the general practitioner of dentistry because of the numerous mechanical, though not always practical, devices constructed for treatment of malocclusion

Many times the fact has been brought forcibly to my mind that history repeats itself in orthodontic methods, that time-worn, antiquated (I was going to say antediluvian) appliances are often resurrected and applied by some practitioner who has grasped perhaps one elementary principle of physics or dynamics which the appliance possessed, and, with unfaltering faith in the principle, has gone blindly on to the rocks of failure without the slightest premonition of disaster.

Such a one was in dire need of a life preserver, so to speak, and it is my desire, if I can substantiate the metaphor, to furnish one, or in other words, to suggest a basis of reasoning whereby one may form a somewhat accurate judgment as to which mechanical principles to select and which to avoid in the construction of appliances for the treatment of the simpler cases of malocclusion.

Inasmuch as expansion of the dental arches is more often required than any other treatment of the simpler forms of malocclusion, a study of the mechanical principles involved in this one line of operative procedure will be sufficiently ample in its scope for the purpose intended.

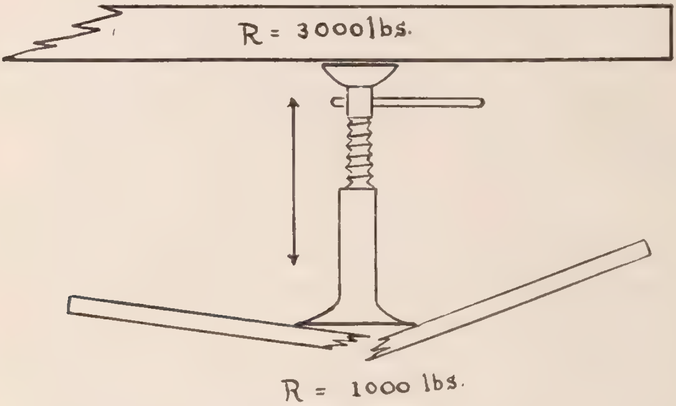

Fig. 1.

In order to proceed with this plan it is necessary that certain laws of physics and dynamics be first understood, that we may have a guide as to the qualifications of an appliance from the only possible standpoint whereby success can be attained.

Assuming that you are familiar with the law that "action and reaction are equal and opposite," I will dwell on it only long enough to state that it is the basis for the study of the problems of force and resistance found in the treatment of malocclusion.

However, this third law of motion is rather unintelligible to many without illustration, and the drawing in Fig. 1 may serve to simplify one's understanding of it.

If a jackscrew is lifting a weight of 3,000 pounds, the force, represented by the arrow, is being exerted in the direction of the load as well as in the opposite direction, and if a substantial base offering sufficient resistance is not provided the exertion of the force would cause the jackscrew to break through the base or foundation instead of lifting the load.

From this illustration can be learned the fact that in orthodontic treatment, the resistance at the points or areas of delivery of a force should be less than that at the base of anchorage of an appliance, so as not to cause the anchor teeth to become unstable and unfit for further use as anchorage.

I have defined anchorage as *"the resistance selected as a base for the movement of teeth,"* and it might be well to emphasize the fact that this resistance is *selected* and for the particular purpose of obtaining a base of anchorage which will have a greater resistance to the reaction of the force applied than exists at the areas of delivery of that force. As an illustration of this principle I might cite the selection of a molar tooth as anchorage for an appliance designed to deliver force against an incisor, the resistance of the molar tooth, by reason of its having several roots and because of the thickness of the surrounding alveolar process, being greater than that of a single-rooted incisor with comparatively thin supporting alveolar walls.

Another very clearly defined but not very generally understood principle relative to anchorage resistance and the application of a force therefrom, is the principle of *fixation* of the appliance in the mouth. By this is meant the attachment of the appliance in such a manner that the patient can not easily remove it, or that the force itself will not remove the appliance, the latter having frequently been done where the fixation principle has not been observed, as in the case of a jackscrew imbedded in a simple roof plate for forcing a cuspid in lingual occlusion outward into the arch, the first few turns of the jackscrew pushing the plate down the lingual surfaces of the bicuspids and molars and out of position.

There is one other point besides the *selection of proper anchorage* (which includes the *principle of fixation)* which will give one a basis of judgment as to the proper requirements that are to be observed in a given case, and that is the selection of an *efficient, controllable* force, capable of being properly applied in the mouth for tooth movement.

From the earliest infancy of orthodontia the problem of what force to use in treatment has seemed paramount, and it is still a debatable question with many operators.

The forces which have been used in orthodontia are embodied in the principle of the inclined plane, the lever, the elasticity of spring wire, and of rubber. the expansion of wood, etc. The inclined plane, although used in the form of the wedge. or the metal or vulcanite inclined plane by many of the early operators, represents in these forms a most inefficient force principle, and it is regrettable that at this late day there should be a single modern textbook advocating its improper use.

As instances of the inefficient use of the simple inclined plane, the following illustration, taken from one of the older and included in some of the newer textbooks, will serve to establish the comparative value of this machine.

In Fig. 2 (Talbot—The Irregularities of the Teeth. page 440, Fig. 294) is illustrated the early use of the inclined plane for moving an upper incisor from "inlock" as it was styled, to its proper labial position. Before making a personal comment on the appliance, I will quote Dr. Talbot's criticism, (page 452), "This arrangement maintains a constant outward pressure upon the superior teeth. Although I have had good results with this method, I do not consider it of any great value, for the reason that as soon as the teeth begin to get sore to touch, pressure is unconsciously removed by the patient and the method proves in most cases to be a failure."

Now, if we examine the anchorage of this apparatus, we shall see that, the appliance being a metallic strip, securely ligated to the lower teeth, the inclined plane is quite firmly held in position. and the resistance is ample for the power to be exerted. but the power is in the voluntary control of the patient in choosing to close the teeth with sufficient force to have the desired effect of moving the incisor outward. The source of power soon failing on account of the increasing tenderness of the incisor, the appliance fails to operate successfully.

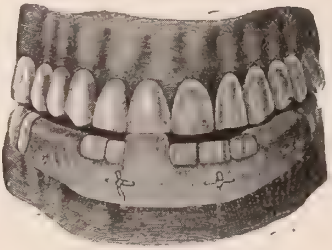

Fig. 2.

A much less efficient combination of the inclined plane and the lever, in which the force is voluntarily applied to the stick by the patient for the purpose of moving outward an upper incisor, is illustrated in Fig. 3.

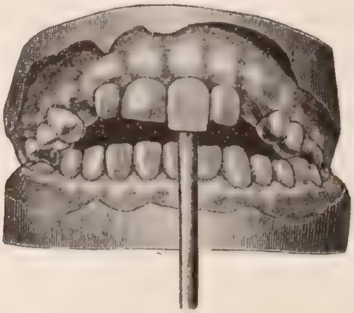

Fig. 3.

The anchorage principle in this case is as inconstant as the application of the force, and the lack of attention to these two important factors stamp the method as inefficient and therefore impracticable.

The use of rubber wedges for arch expansion, Fig. 4, is illustrated in Dr. Kingsley's book as one of the earlier methods which was successful in some cases. The force used is not the wedge or inclined plane, but the *elasticity of compression* of rubber, which is very painful as made use of in the manner shown, the force not being under control. A simple wedge between two teeth is painful enough, and the pain produced by a dozen or more wedges operating at the same time would be unbearable by the most Spartan-like victim. There is no anchorage principle evident in the use of rubber wedges in this manner, the resistance of all of the teeth soon being made unstable, which likewise stamps the method as impracticable.

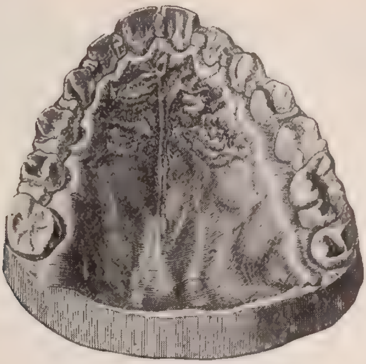

Fig. 4.

The use of the principle of the inclined plane in the form of a jackscrew (Fig. 5) as devised by Dr. Dwinelle in the early days of orthodontia, was a distinct advance over the attempted use of the inclined plane as shown in Fig. 3. Of these early jackscrews, the first three are with right and left threads, the latter being capable of producing force in the directions of their length more rapidly than the simpler forms. They were made of steel, and corroded very quickly in the mouth, and their force principle soon became ineffective on this account.

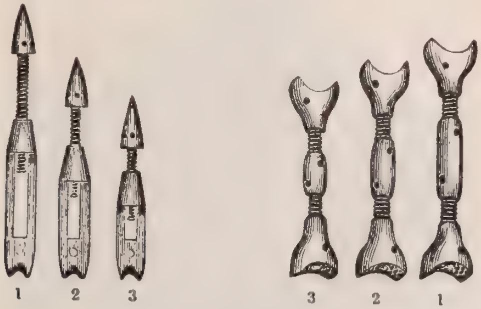

Fig. 5.

The ends of these jackscrews were either pointed to fit into a cavity, or curved to fit the lingual surfaces of the teeth, the only re-enforcement of such slight anchorage being that they were sometimes tied into position with silk or wire ligatures.

In these jackscrews is embodied a powerful force and yet, if we analyze it, we shall understand how inefficient it is for the purpose of arch expansion. In Fig. 6 is illustrated the simple forms of the modern jackscrew and traction screw made of German silver or gold alloy, and the arrows show the only possible directions of exerted force, viz., in the direction of their length.

With an appliance producing force in two directions only, such legitimate tooth movements as the moving outward of a lateral incisor, using a molar or bicuspid for anchorage could be performed if the jackscrew was sufficiently anchored as in Fig 7, but even with a firm anchorage, the movement of a tooth in more than one direction with the jackscrew would be impossible.

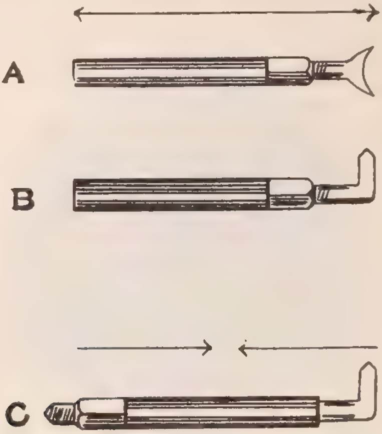

Fig. 6.

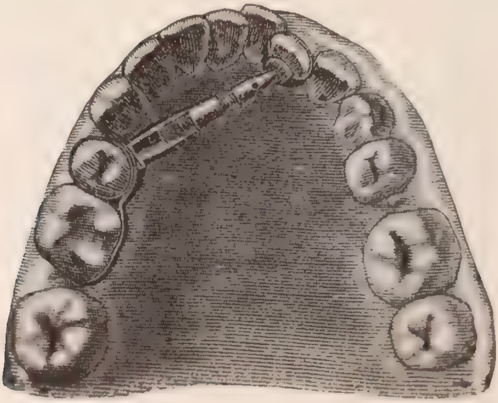

Fig. 7.

For example, Fig. 8 illustrates the use of the compound jackscrew for moving two lateral incisors into position and it may be well to explain from a drawing showing by vector lines the application of the force (Fig. 9), why it is impossible to correct the malpositions of these teeth in this manner.

The line A B represents the directions of the applied force of the jackscrew, and the lateral incisors will move in the direction of A and B only until they encroach upon the cuspids. In reality, force is needed in the direction of E C and E D to move these laterals outward, and as the jackscrew does not produce force along these lines the operation can never be completed with the jackscrew without the use of another set attached in such a way as to operate along the lines E C and E D.

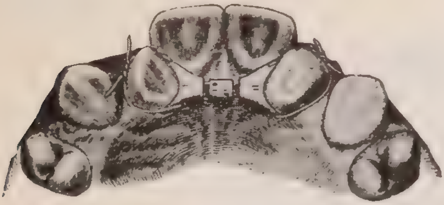

Fig. 8.

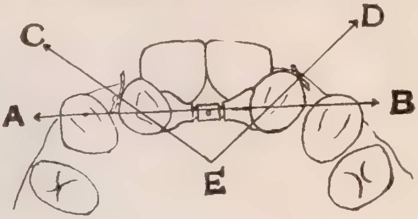

Fig. 9.

This fault was noted by Farrar who devised a series of connected jackscrews capable of operating in many different directions as shown in Fig. 10.

The appliance was extremely complicated, and, as is seen, a jackscrew was needed for every tooth to be moved outward into alignment, as well as the simple jackscrew across the arch for expansion.

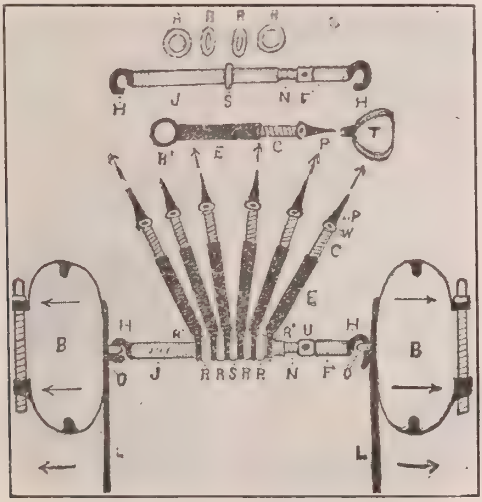

Fig. 10.

Even at this early stage of orthodontic history, it was realized that force was needed to be produced by an appliance in as many directions as possible, and were this a problem in mechanics outside of the mouth, there is no doubt but that this arrangement of jackscrews in series could be effectively used, but in the mouth this appliance left no room for the tongue, for speech and for mastication, hence it had to be discarded.

There is a distinct advance in Farrar's conception of the requirements of appliances over that of his predecessors and over that of many who have succeeded him, for at least he secured a fairly substantial anchorage by means of clamp bands surrounding two molars on each side, these clamp bands being re-enforced by lingual wire extensions, and the force was also capable of operating in many different directions.

A less cumbersome combination of the jackscrew and roofplate, illustrated in Fig. 11 (Kingsley), exhibits the use of a powerful force improperly applied for expansion of the arch. The improper application of the force consists in the lack of sufficient fixation of the plate, for a few turns of the jackscrew would force the plate out of position. Also, the plate was so rigid that the jackscrew had a tendency to break it rather than move the teeth with which it engaged.

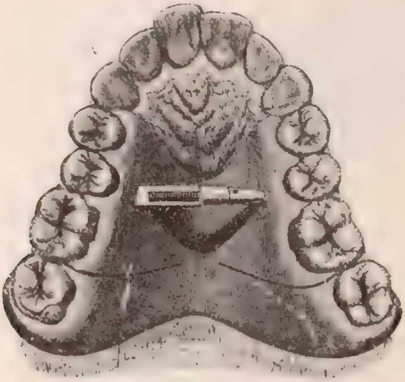

Fig. 11.

An improvement over this form of plate, devised by Dr. Kingsley, is the split vulcanite plate with jackscrew, Fig. 12, allowing of greater range of lateral movement of the appliance, but not necessarily of the teeth, since the anchorage was not increased in any way. In both of these plate combinations, force can be exerted in but two directions in the horizontal plane and those in the line of the length of the jackscrew, hence they are inefficient for producing expansion of the dental arch. The same lack of fixation of the plate as in the other examples shown renders the anchorage unstable.

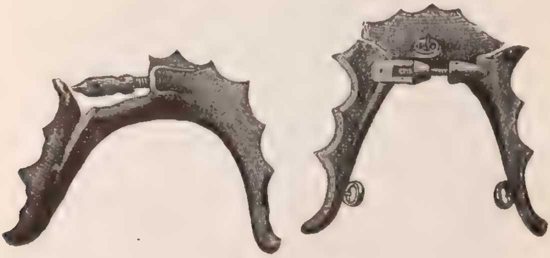

Fig. 12.

Another form of the jackscrew used across the arch for expansion, illustrated in a book by Dr. M. H. Knapp, is shown in Fig. 13.

In this case the anchorage resistance for the jackscrew is probably sufficient, but as the force of the jackscrew is exerted in but two directions, only those teeth influenced by the bar at right angles to the direction of the force of the jackscrew will be moved. The centrals, laterals and cuspids cannot be simultaneously moved outwardly to alignment with this appliance, consequently it also is inefficient. The same criticism that was made of Farrar's multiplicity of jackscrews in obstructing the oral cavity applies equally well to Knapp's appliance, and to any of the numerous instances in which the jackscrew has been recommended for arch expansion.

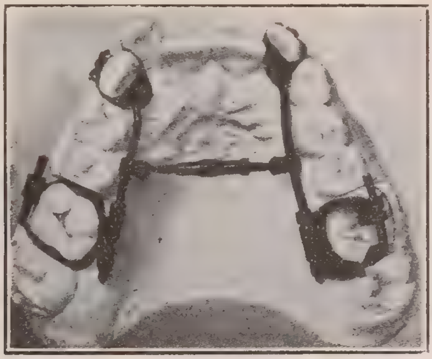

Fig. 13.

Relying upon these examples of the improper application of the jackscrew for arch expansion to have convinced you of their inefficiency of force and anchorage, a study of the spring and its combinations that have also been improperly applied will enable you to understand the handicaps encountered by many of the early operators in orthodontia as well as by many of their present-day followers.

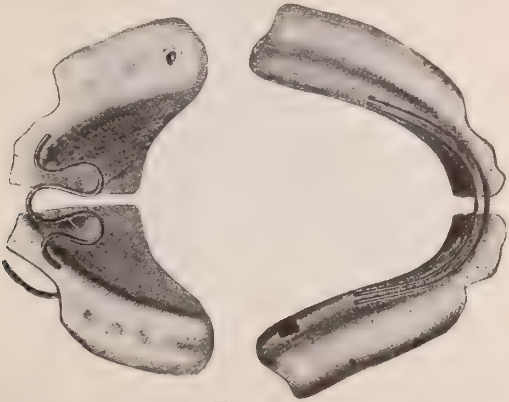

Fig. 14.

Fig. 14 illustrates the Coffin split plate, introduced into this country from England, and exemplifies the early use of the spring for arch expansion, the plate being fitted over the occlusal surfaces of the teeth in the attempt to secure anchorage resistance during the process of expansion by the spring. The double loop of the spring gives it considerable latitude and power, but the anchorage resistance is unstable and the plate covering the occlusal surfaces of the teeth is very unhygienic.

Another combination of a hinged plate and coiled spring is shown in Fig. 15. In this apparatus the resistance is re-enforced by clasps upon the molars, but the power as directed by the hinge, is improperly applied, and the action is self-limited, so that it would be almost impossible to make any use of it in arch expansion.

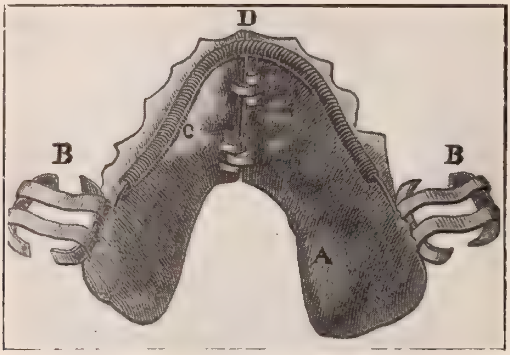

Fig. 15.

In Fig. 16 is exhibited a combination of the Talbot coiled spring with vulcanite-covered extremities fitting the lingual surfaces of the bicuspids and molars and designed for the purpose of expanding the arch. This appliance is also but partially efficient, its power being exerted on the teeth embraced by the vulcanite arms, in a hinge-like action, and its anchorage resistance, not being re-enforced in any manner, is unstable.

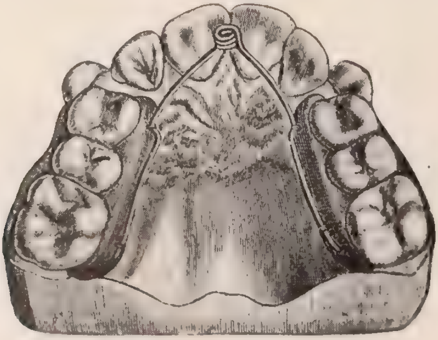

Fig. 16.

The Jackson spring combinations for expansion of the dental arch, an example of which is shown in Fig. 17, when constructed so that they are removable by the patient, do not conform to the principle of fixation so necessary for continuous positive action in an appliance. By reason of their being thus removable the force is to a certain degree not under control of the operator, hence their efficiency depends upon the nearness to which their anchorage approaches fixation.

Another combination of the jackscrew to spring clasp attachments for the expansion of the dental arch (Fig. 18) exhibits a very great force upon a very weak anchorage. and is thus open to criticism if the writer's premises that fixation of the anchorage is an important principle in efficiency is correct.

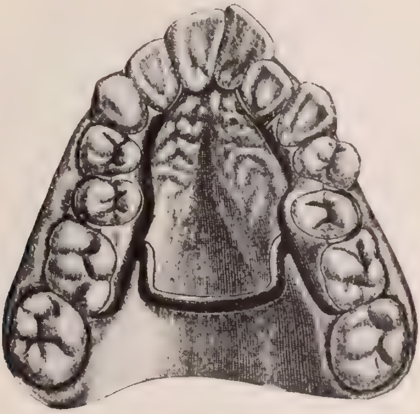

Fig. 17.

From the many illustrations of appliances shown, it is evident that in most instances an appliance capable of producing but one form of force has been used, and in a position or under such conditions that, whereas the force was powerful enough, the anchorage was unstable, thus making the appliance inefficient.

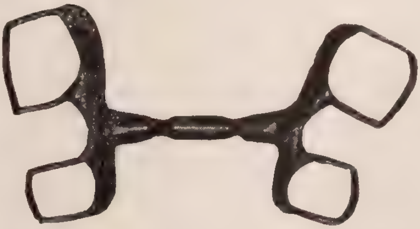

Fig. 18.

From these appliances to the modern expansion arch is a long step in advance, and in order not to transgress too much upon your time, the connecting links in the evolution of this modern appliance for arch expansion will be omitted.

Suffice it to say that the expansion arch, in a crude form, was used by Fauchard in 1728, by Shange in 1850, by Fox in 1830, by Harris in 1850, and by Farrar, although its superiority was apparently not recognized.

However, from these crude efforts the perfected expansion arch and anchor clamp bands of Angle (Fig. 19) were finally evolved. The earlier flat band was changed to a round elastic wire, threaded at the extremities, and fitting into round buccal tubes on the clamp bands, which were made to encircle one tooth only.

A study of the anchorage of the expansion arch in Fig. 19 shows it to be the most fixed anchorage yet discovered. A bolted clamp band, reenforced by being cemented upon the tooth, and also if necessary by lingual wire extensions, and oval or square buccal tubes, affords an anchorage that has the maximum of resisting power to forces tending to displace it.

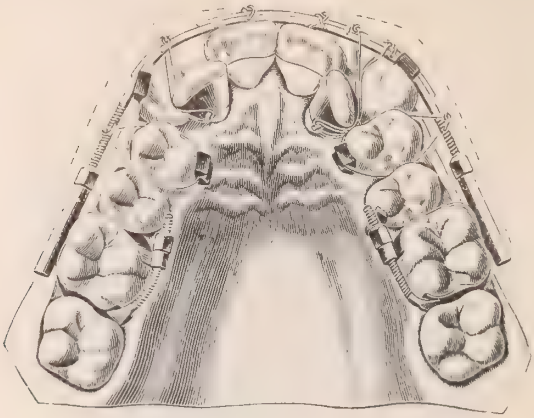

Fig. 19.

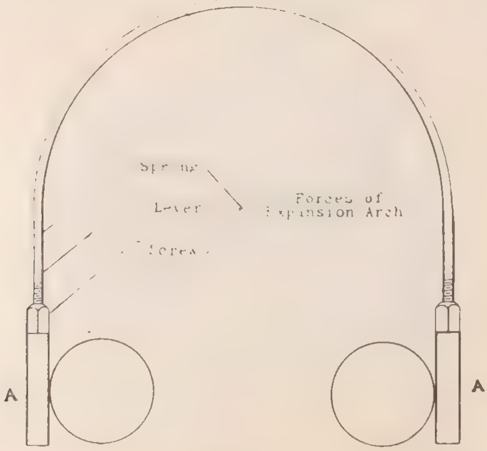

Fig. 20.

It is evident that the modern expansion arch must have some peculiar virtue to be acclaimed as a force-producing appliance for expanding the dental arch superior to any of the other appliances described.

Whereas, most of the appliances previously described exhibit but one form of controllable force, the expansion arch possesses the inherent forces of the spring, the screw and the lever, each capable of being used. (Fig. 20).

Again, being formed on the arc of a circle and applied to the labial and buccal surfaces of the teeth, it is in a position where it does not interfere with speech nor mastication, where it has control of all of the teeth in one dental arch, where it can have a fixed anchorage in the buccal tube of a clamp band or plain band, where its reciprocating action in expansion can be fully taken advantage of for any number of teeth, and where either inclination (tipping) or bodily movement may be applied.

In the drawing of the expansion arch in Fig. 21 it may be observed that force may be produced with it in both the horizontal, and vertical planes by the use of the spring and screw power. The dental arch may be lengthened, widened and developed vertically corresponding to the natural directions of development in three dimensions of space with the expansion arch, utilizing forces which can always be under the control of the operator.

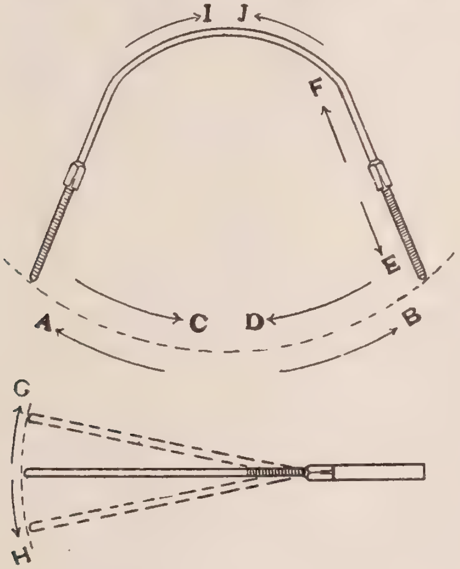

Fig. 21.

Fig. 22 illustrates the expansion arch in position for utilizing the force of the spring, the arch being placed a few millimeters distant from the incisor teeth so as not to move the incisors lingually through the leverage caused by the expansion arch obtaining a fulcrum on the incisors. The lingual bar extension, by the use of one ligature, provides for expansion in the bicuspid region, and the bar often may be extended to include the cuspids, or second and third molars.

When the use of the lever is called for in arch expansion the expansion arch may be adjusted as in Fig. 23 to accomplish this purpose, the ends of the arch being sprung, not bent, into the lingually-posed buccal tubes, so as to rotate the molar anchor teeth by the compound leverage obtained.

Inasmuch as the elements of any force are (a) its magnitude, (b) its direction, and (c) its point of application, a brief analysis of the forces of the expansion arch along these lines may serve to more clearly fix in one's mind the relative importance and use of these forces.

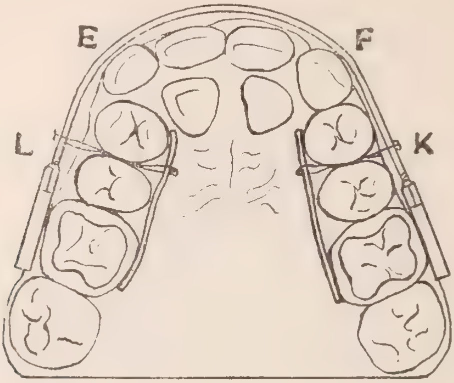

Fig. 22.

In their *magnitude,* some of these forces are greater than others, for example, the force of the screw being greater than the spring, but as related to arch expansion, the force of the spring is first in importance, since it is chiefly by this force that the dental arch is expanded.

The force of the screw, then, is a secondary one, being used usually to increase the length of the dental arch when desired or to increase the length of the anterior arc of the expansion arch. It is also especially useful in moving teeth directly in line with its lines of force as in moving incisors, cuspids and bicuspids forward.

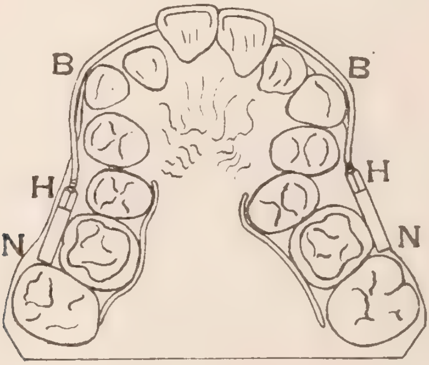

Fig. 23.

In considering the *direction* in which the forces of the spring, the screw, and lever are exerted in arch expansion, a simple rule to remember is that the screw produces force in the direction of length of the dental arch, the spring exerts force in the direction of length and width of the dental arch, and the lever, when rightly used, delivers a force to rotate or tip up individual teeth especially the molar anchor teeth.

Referring now to the *point of application* of these forces, we shall see that through the *manner* of their application chiefly are the *directions* of these forces controlled so that teeth are made to move in the directions desired to obtain accurate and scientific results.

For example, if in arch expansion the expansive force is applied at points or horizontal lines on the lingual side of the dental arch as in Fig. 24 with the use of round buccal tubes on molar bands and ligatures on bicuspids, the result will be more in the nature of buccal tipping or *inclination* movement of the teeth so attached to the appliance.

For many years the expansion arch has been successfully used with such a simple anchorage, the round buccal tube allowing of more or less tipping of the anchor teeth, and the buccal and labial ligatures having somewhat of the same tipping effect upon the other teeth, and while methods are in use for overcoming these apparent defects in the control of the force of expansion, in many of the simpler cases the use of the expansion arch in round buccal tubes and the teeth controlled by ligatures is all that is demanded.

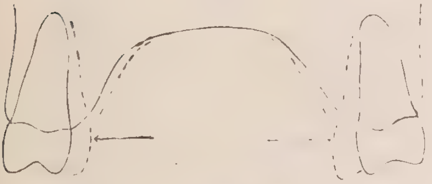

Fig. 24.

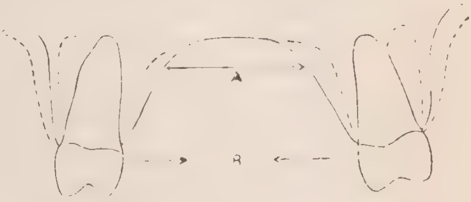

Fig. 25.

However, in the overcoming of these defects in the application of the forces of expansion, it is first necessary to apply the forces so that the effect will be in the nature of a *bodily* movement of the teeth, or the ends of the roots of the teeth moving bodily outward, as shown in Fig. 25.

There are a great many cases where such bodily movement of the anchor teeth as well as of other teeth in the arch is demanded, and the various modifications in the construction of the buccal tubes that have been made in the last few years to secure stationary anchorage of the anchor teeth for such bodily movement are shown in Fig. 26.

A represents an oval tube and oval arch wire; B, a sliding lock devised by Dr. Hawley; C, a sliding lock device of Dr. Ottolengui; D, the square tube of Dr. Kemple; E, F and G, varying methods in use with the horizontal buccal tubes of Dr. Barnes, all serving the purpose of effecting a stationary anchorage of the molar for bodily movement.

Finally, in securing bodily movement of not only the anchor teeth, but of the other teeth in the dental arch, the latest evolution of the expansion arch, in the form of Dr. Angle's new appliances, seems to have solved most of the difficulties.

These new appliances provide not only for stationary anchorage in the molar region by reason of a flattened buccal tube and flattened arch ends, Fig. 27, but also for the bodily movement of the anterior teeth by means of adjustable upright rods accurately fitting delicate tubes on incisor, cuspid or bicuspid bands.

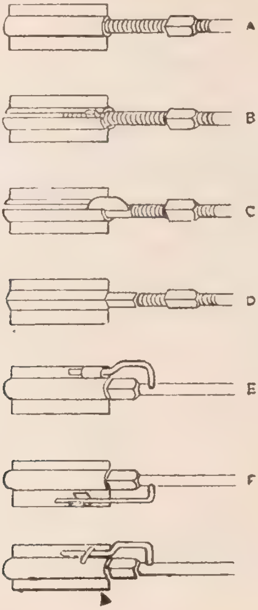

Fig. 26.

In the use of these lately-evolved appliances, nearly all of the obstacles to ideal treatment have been removed, but especially noticeable is the fact that still more difficult problems in dynamics and anchorage have been solved than are possible of solution with the plain expansion arch. Anchorage has been made more stable, rather than less, and new methods of anchorage devised. By means of these new appliances force can be delivered more delicately, and yet more accurately to zones needing development than is possible with the plain expansion arch.

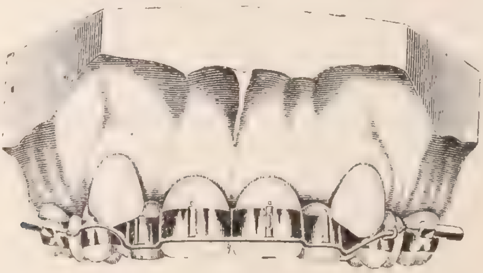

Fig. 27.

The skillful use of these new appliances, however, is a little beyond the ability of the average general practitioner, without the extra training in technic and experience of the specialist. This would indicate that there is a field of operations in orthodontia which belongs to the specialist alone, and as time goes on, this field will be more clearly recognized, and the services of the specialist will be in greater demand because of his ability to perform a better service than the average dentist.

To briefly summarize the important points of this essay there were first described the cruder methods of expanding the dental arch and the various devices employing the force of the inclined plane, the screw and the lever, and through a process of elimination of inefficient force principles the correct forms of appliances were exemplified and the correct forces illustrated for expansion of the dental arch.

As a basis for the deductions made, the principles of physics and dynamics were shown to be pre-eminent in solving the problems of the correct use of forces, of the proper relations of force and resistance, of the value of fixation of appliances for establishing fixed resistance for anchorage, of the relative value of the forces of the spring, of the screw and the lever in expansion, and of the methods of obtaining inclination and bodily movement.

Finally, there was suggested a method of reasoning whereby the dentist might judge of the relative value of the many hundreds of mechanical combinations suggested in text books, papers and clinics, and possibly thereby be able to avoid some of the numerous pitfalls which have befallen almost every orthodontist of any experience and out of which he has crawled, a sadder, but wiser man.

As a final word to the dentist electing to practice orthodontia, it may be said that obsolete or experimental methods in orthodontia are costly, and are a waste of time of both patient and operator, as results are seldom obtained. Scientific methods, which are evolved from the application of the known principles of physics and dynamics to the mechanics of orthodontia, are the only methods which can produce results.

In these days of progress in every science, inefficiency is inexcusable, and no matter whether it is the specialist practicing orthodontia, or the general practitioner electing to do a certain amount of orthodontia, their efforts will be judged from the standpoint of efficiency.

Behind all this talk of efficiency is the fact that as far as the mechanics of orthodontia is concerned, a knowledge of the principles of physics and dynamics is imperative as a basis for forming an accurate judgment of the relative value of force principles and their proper application in orthodontia.

Whatever the incentive or necessity for the dentist practicing orthodontia, the most helpful advice to him would be to practice orthodontia according to modern up-to-date methods, or not at all.

The extent of the orthodontic practice that the dentist can successfully do, is dependent upon his knowledge of these principles of the mechanics of orthodontia and his ability to apply them.

This is only one side of the question, however, to emphasize which the paper was written; even these mechanical principles can only partially avail if a general knowledge of occlusion, development of the dental arches, the development of the internal and external face, the esthetics of the face, the pathology of the nose and throat and their relation to mouth breathing, and the general relation of etiology to treatment, be not understood.

131 Allen Street.

CROWN AND BRIDGE WORK*

BY F. W. KNOTT, D.D.S., ST. LOUIS, MO.

IN PRESENTING THIS PAPER, I am going to confine myself to a few of the problems that arise in the construction of crowns and fixed bridges so that they may as completely as possible restore the mechanical and cosmetic functions of those teeth whose place they are designed to fill.

While the preservation of the natural teeth and surrounding tissues in a normal and healthy condition is the most sacred duty of the dental profession and a duty which it is now striving nobly to perform, it still has and will have for several generations to come the proposition of the restoration of teeth, lost either from early neglect, accident, or as is unfortunately often the case, incompetent or careless dental operations.

While the arraignment of the American dentist by Dr. William Hunter, of London, England, that through his crown and bridge operations he was establishing septic conditions in the mouths of his patients was undoubtedly more or less prejudiced and exaggerated, yet to our sorrow we must admit that he has some grounds upon which to base his assertions.

While there are many cases presenting themselves that can best be served by properly-constructed removable bridges or attached partial plates, there are more in which the most serviceable, comfortable and esthetic restoration seem to be through the medium of the crown and fixed bridge.

We are all interested in the splendid fight that the profession of our country is making for oral hygiene, and one of the most important factors of a normal hygienic mouth is a full masticatory equipment, in proper occlusion, correct contact points, normal interstitial spaces and healthy gum conditions, so it is the duty of the dentist in the placing of crowns and bridges which are to replace the missing members of the masticating force to so construct them that they will advance rather than retard the hygienic oral conditions toward which we are laboring.

In taking up the construction of crowns I will first consider the shell crown as it is the one in most general use and by its improper and careless handling has been the cause of the greater part of the trouble arising from this class of restorations. Right here, however, I wish to digress from my subject proper and say that in cases where the tooth is not to carry a bridge anchorage there should be a very careful consideration of conditions before deciding on the best means of repair as in many instances the comfort and well-being of the patient will be better served even by filling of badly broken-down bicuspids and molars with amalgam supported by screw posts cemented into the canals, using, if necessary, well filling bands of thin German silver or copper as matrixes which can be removed the following day and the filling polished. The tooth so treated may eventually have to be crowned but by postponing that time as long as possible we give to the tooth a more extended period of comfortable service.

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*Read before the St. Louis Society of Dental Science September, 1913.

When the conditions seem to demand the placing of this type of crown the work must be done most carefully and thoroughly if we would avoid gum irritation with all its attendant evils.

Much has been written on the preparation of the teeth for the reception of a shell crown and I will not go into a lengthy description of the technic of the operation, but will say that all of the contour must be cut away and the tooth so shaped that the band will fit it perfectly just below the margin of the gum. Cases requiring extensive cutting are naturally those in which the tooth is to serve as a bridge anchorage and I think it advisable to devitalize as, if this is not done, a proper preparation is likely to be most painful to the patient and to result in the ultimate death of the pulp; or the operator will be disposed, through sympathy for the sufferer or in response to his demands, to stop far short of a thorough operation.

As the preparation approaches the gum line it should proceed with great care as the gum must be injured as little as possible and the pericemental membrane not at all. The preparation at this point is best completed with enamel cleavers and coarse sand paper disks. In cases of elderly patients where there has been considerable absorption of gum and alveolus, and probable recession of the pulp, a half crown, with no attempt to carry it beyond the gum line, will often give excellent results and devitalizing will not be necessary. In any case a crown which is well adapted to the tooth even if it does not reach beyond the gum margin is safer and better than one that extends too far beyond the margin and is not closely adapted.

With the tooth properly prepared an accurate wire measurement is taken just under the edge of the gum, the band cut and soldered and is now ready to fit. This is another important step in the operation. The band should be placed on the tooth, the gum and line marks on it and it should then be trimmed so that it is at all points just barely beyond the gum margin. It is then contoured so as nearly as possible to take the form of the natural tooth and particular attention given to restoring the proper contact points with the approximating teeth. The edge of the band should then be thoroughly burnished to the tooth, especial care being given to the mesial and distal margins. If the tooth has been correctly prepared and the band properly contoured and burnished, the interproximal space will be practically normal and the gum septum will be, and will continue to be, in a healthy condition.

The masticating surface may be constructed by any one of several methods, the important points being good occlusion with well-defined cusps and sulci, and sufficient thickness and hardness to withstand the demands imposed upon it. In my opinion the quickest and best method is to carve them in wax and cast on the band.

In crowning the six anterior teeth and many of the bicuspids, I think it advisable whenever possible to avoid the banded crown. The incisors and cuspids can, as a rule, be so prepared either by sloping the end of the root from the center labially and lingually or cutting a decided step on the lingual that a burnished or cast diaphragm will protect the root from probable fracture; and, with a good strong post well fitted into the enlarged canal, will make an ideal base upon which to construct the crown; and it will be free from the gum irritation so commonly found where the banded crown has been used.

The detached post porcelain crowns used with a cast base make very beautiful as well as hygienic and comfortable restorations for the six anterior teeth and in many cases for the bicuspids as well. When for any reason it is decided to use the Richmond crown, the preparation of the root and fitting of the band must be carried out with the same thoroughness as with the shell crown.

In the consideration of the instruction of fixed bridges, one of the present-day problems is inlay abutments. One point in favor of their use is that when properly constructed they cause absolutely no irritation and do not in any way interfere with the subsequent care of the tooth and gums. The inlay as a bridge abutment, however, presents an entirely different problem than one whose office is simply that of a filling. In the latter case the cavity must be so prepared that it will receive the inlay and at the same time be retentive against the stress of mastication. Where the inlay is to serve as a bridge anchorage this is not at all sufficient. It must not only be able to resist the direct stress put upon it in masticating but also the leverage action of the bridge which has a tendency to lift it from its seat. This must be provided against by the use of pins or posts of sufficient length and stiffness to hold it firmly in its place. Used in any of the single-rooted teeth and especially the cuspid, with the post extended well into the canal it makes a splendid abutment, is strong and sanitary and can be so constructed as to in no way disfigure the tooth. In some small bridges it may be safely used in live bicuspids and two or three in molars, putting the pins as far as possible from the pulp.

The use of various forms of hood inlays on live teeth for anterior abutments seems to have met with some favor but for myself I have not much confidence in them.

In preparing the tooth for an inlay abutment the surface facing the space to be filled must be cut away sufficiently so that that portion of the inlay will extend far enough cervically, buccally and lingually that there may be room for strong solder attachment to the dummy and at the same time leave all margins well in the clear so that they can be properly burnished and polished and easily kept clean.

In the case of a single-rooted tooth a good course of procedure is to fit the post well up into the canal, mark it at a point that will be about the center of the inlay and bend it at a right angle, letting it protrude through the approximal surface of the wax one or one and one-half millimeters. This not only makes a stiffer and stronger inlay but the protruding post giving good attachment for the solder, it is not necessary that it shall cover much of the inlay surface.

In assembling the bridge the matter of hygiene must again be kept in mind and attention to a few details at this time will mean much toward the successful outcome of the case. The dummies next the abutments must be so prepared that the normal interproximal space will be preserved between dummy and abutment. This leaves the gum at this point in a healthy condition and also leaves room for the burnishing and polishing of the abutment margins, and for treatment of root and gums should this become necessary at any future time.

The dummies should be nicely fitted to the gum so that food particles cannot collect under them and still not press sufficiently into the gum to cause any irritation. If the dummies are not extended to contact with the gums there should be no facings used, simply a masticating surface sufficiently thick to withstand the stress and wear, leaving all the open space possible. This, I think, in many cases, especially in lower posteriors, is a very satisfactory construction.

In making anterior crowns and bridges, the staining of the facings with high fusing enamels and mineral stains to reproduce the spots and lines so often found in the teeth, often adds much to the natural effect; and where there has been a considerable absorption of gum tissue, the baking of gum enamel on the necks of the facings helps greatly in bringing about an esthetic and pleasing restoration.

Where the bite is of fairly good length the interchangeable, all-porcelain molars and bicuspids or the pinless vulcanite on cast base may be used and make better appearing dummies than those with gold masticating surfaces. They are strong and serviceable and are easily replaced if broken.

In finishing the bridge attention must be given to eliminating any pits or pockets that may retain food debris. Any such that cannot be ground out should be filled. This can be done easily and quickly with any form of fibre gold. The facings should be carefully inspected to be sure that all surfaces that come in contact with the gum are perfectly smooth and non-irritating. If the solder has run down too far between the dummies and abutments it must be cut away to leave the before-mentioned interproximal space. The whole piece should now be given a high polish, not forgetting the edges of the bands of the crowns which must be smooth.

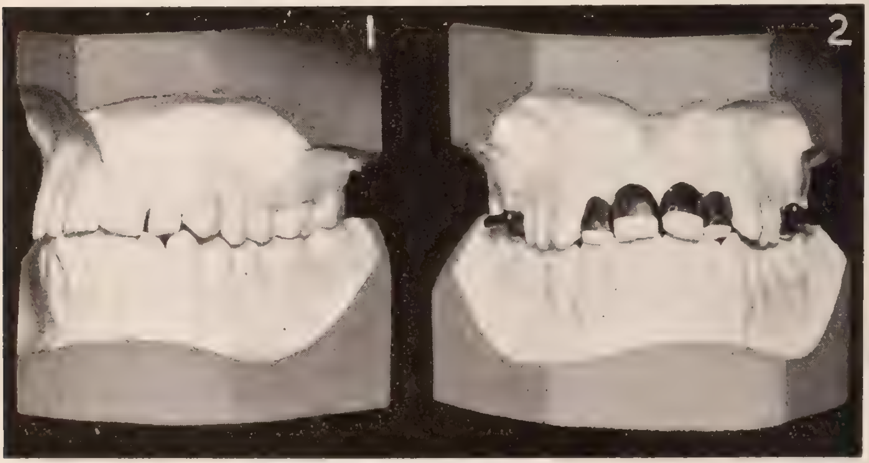
The patient should be impressed with the fact that it requires even more attention to keep a bridge in a sanitary condition than is necessary with the natural teeth; should be instructed as to the best means to accomplish this end and urged and encouraged to be faithful and thorough in its care.

AN ORTHODONTIA APPLIANCE FOR BODILY MOVEMENT, ELIMINATING LIGATURES

BY W. E. NEWCOMB, D.D.S., CLEVELAND, OHIO

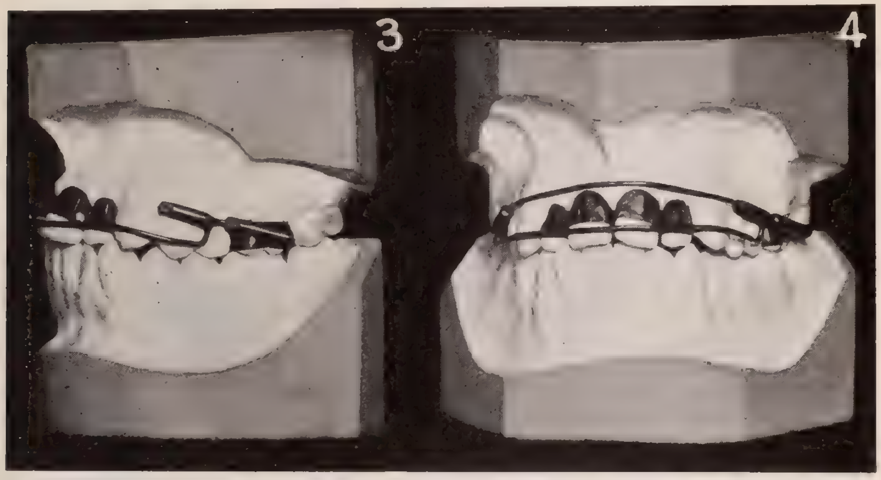
IN PRESENTING THIS APPLIANCE I make no claim to originality. The application of force as applied is a principle well known and as old as orthodontia itself. The distribution of force to the individual teeth and the reciprocal force obtained is perhaps novel—but probably not. I am expecting any day to hear that some ambitious member made this years ago.

The appliance, while designed especially for the upper six anterior teeth in Class 1 and Class 3 cases (Angle classification), is equally applicable to all cases, and particularly so for the type of deformity shown in Fig. 1. This is a case that was treated eight years ago and failed because the teeth, instead of being moved, were only tipped. Note the lack of development over the roots of the six anterior teeth. It represents one of the most common mistakes of dentists; viz., the attempted alignment of the crowns of the teeth with very little thought of the position of their roots.



With the exception of fitting bands to the anterior teeth the entire appliance is made on a model, and this is one of the big points in its favor. It is vastly easier to sit down quietly in your laboratory to construct a delicate appliance than to do the same work in the mouth of a wiggling child. The first step is to take two sets of impressions—one set of models to be retained as a record of the case, and the other from which to fit the molar bands, adjust and solder the buccal tubes, and roughly adjust the lower or alignment arch. For convenience of description we will call the upper arch the contour arch and the lower the alignment arch.

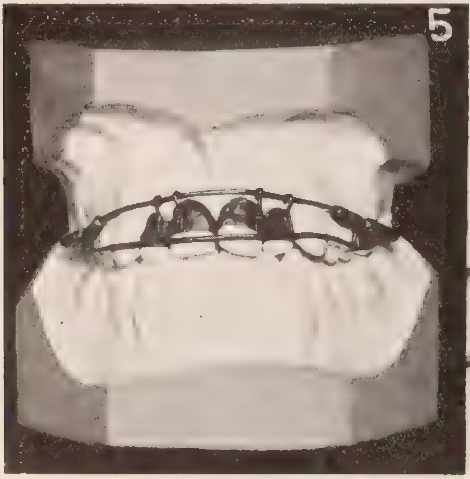
The wire separators are inserted and the patient is then dismissed for one week with orders to report at once if the separators become displaced At the next sitting the molar bands are ready with the Barnes power tubes properly aligned and soldered in place. They are clamped onto the molars and burnished to a fit.



Bands are now made for the anterior teeth to be moved and the seams must be on the lingual surface. To the labial surface of each of these bands are soldered tubes parallel with the long axis of the teeth and considerable care is necessary to insure their proper placement. For example; the centrals in Fig. 1 must both be rotated—the distal surface of each coming forward. Therefore, the tubes are soldered to the distal of the center, or towards the surface of the tooth requiring the greatest movement. An impression is now taken with all the bands in place and a model obtained similar to Fig. 2. The alignment arch is now adjusted and bent in such a manner as to "lie dead" (without tension or expansion) in contact with and as close to the incisal edges of the teeth as possible. To this arch and directly in front of the screw of the power tube is soldered a second power tube smaller in every dimension than the first to carry a 19 ga. arch or of any size to suit the needs of the case. After this step the appliance is seen in Fig. 3.

The upper or contour arch is now ready for adjustment. To determine the length of arch necessary it is advisable to use the large size wire ligature, which can be slipped into the power tubes, then removed and straightened, thus forming an accurate gauge for the length of arch required. When this arch is in position the writer prefers to have it stand away from the gum 1/32 of an inch and about the same distance above the cervical border. A great deal of care is necessary in the adjustment of this arch, because to a large extent the efficiency of the appliance will depend upon its accurate adaptation. Fig. 4 illustrates the appliance at this stage.

The pins or staples are now ready for fitting. This is done by flattening one end—the end that engages the contour arch. The pins are bent somewhat to resemble a question mark and the flattened end wrapped around the arch and pinched together. The pins may be inserted in the tubes either from in front of the arch or back of it, but of course are not entirely closed around the arch until the final adjustment in the mouth, when fifteen minutes will be ample for adjustment of six pins. For this work the needle-pointed opticians' pliers are well adapted. The pins must not fit the tubes too closely or much trouble will be experienced in assembling the appliance in the mouth. The pins are 21 ga. B. & S. and the tubes receiving them are 21 ga. inside and 18 ga. outside diameter. Fig. 5 shows the appliance complete.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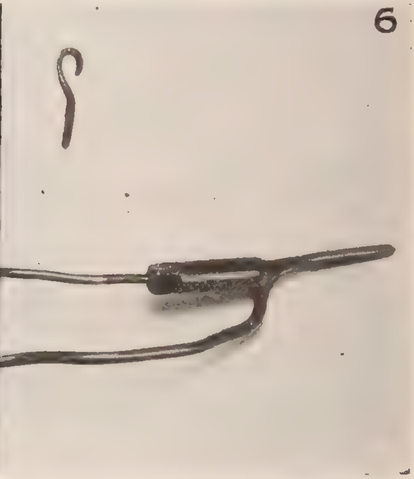
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Fig. 6 shows the relative position of the two arches and the point at which the power tube is attached to the alignment arch, also a side view of one of the pins.

It now becomes a case of reciprocity. The nuts receiving the contour arch are screwed forward, exerting forward pressure on the roots of the anterior teeth and at the same time the distal pressure is received not so much on the molars as on the incisal edges of the anterior teeth. So every time a forward pressure is applied to the roots of the teeth, a distal force is exerted on their crowns and the control is next to perfect, due to the two power tubes on either side. The power of this appliance is practically unlimited and, so far as the writer's experience has gone, this represents the only danger in its use, as the tendency is to go too fast.

The advantages of the appliance are at once so apparent as to counter-balance the time and the patience necessary for its construction. The elimination of decay during treatment is one of the big points in its favor. No ligatures are used and every tooth to be moved is banded and the band cemented in place so that the enamel is not in contact with the appliance. Personally it has never seemed of any great advantage to correct malocclusion if the teeth themselves were doomed to come through the treatment filled with decay and covered more or less with decalcified enamel. Volumes have been written on malocclusion and its treatment, but it is always in private and with the soft pedal when ways and means for preventing decay are discussed or even the possibility of decay admitted. Every man who has done much orthodontia has caused some decay, but this is no more reason for condemning the work than that we should discard anesthetics because there is an occasional accident.

Another distinct advantage is the almost total absence of soreness after the first twenty-four hours. The pressure is steady and the teeth are held so rigidly in place that a complaint is the exception.

A feature also worth while is the lack of expense. The entire appliance is made by the operator with the exception of the power tubes, which are patented and can be purchased in the different metals at a nominal cost. So, with the exception of the power tubes, this appliance can be made without paying a royalty to any one.

At present I have several cases under treatment with this appliance and the results have been thoroughly pleasing; in fact, far beyond expectation. The treatment of these cases, however, is not yet complete and the writer does not feel warranted in removing the appliances for the sake of obtaining models and photographs But from present indications there will be something to report later on the subject of root movement.

AN EFFICIENT DENTIFRICE

E B. LOOFBORO, D.D.S., MILTON JUNCTION, WIS.

Dentists are realizing more and more the necessity of mouth cleanliness in maintaining a healthy condition of the oral cavity, and nothing should be left undone that will assist the dentist in his efforts along these lines.

In a general way, the average dentist advises a good dentifrice to his patients, but I firmly believe (and have for years) that dentists should specify clearly, and wholly from the merits of the preparation based entirely upon personal experience. After experimenting vainly for years in an effort to find some preparation that would meet the requirements, i. e., do the work for patients in their daily care of the teeth, I can unhesitatingly say I have found what I have desired in the All-In-One tablets supplied by the Ransom & Randolph Co., of Toledo, Ohio—a preparation that has given universal satisfaction in my practice and especially so in patients under treatment for pyorrhea. They are certainly repeaters and practice builders.

OFFICE PROMOTION OF ORAL HYGIENE*

BY E. W. REAM, D.D.S., CRAWFORDSVILLE, INDIANA

THE TWO ESSENTIALS OF LIFE are good health and good habits. Lessons must be learned by everybody. The young have their lessons in school, and colleges add their lessons to these, and thus the person begins life's experiences. The early lessons in school and college are easiest. The bitter school of experience deals out the hardest propositions.

The most important lessons of life are learned in two ways: first, by our own experience; second, by the experience of others. The alert and thoughtful choose the latter upon which to base their deductions and conclusions.

The lessons of life are hardest of all to learn. Separate good health and good habits, and there follow inconsistencies. The best interests of the individual, state and nation are jeopardized. Hold them together and there would be little need for us to discuss "Office Promotion of Oral Hygiene."

There are evolutionists who say that every inconsistency ultimately works its own correction. However this may be, it is certain that Nature has a penalty for the violation of any of its laws. When Dr. C. J. Grieves said, "when we review the works of Kirk, Talbot, Rhein and others, can we question for an instant that the predisposing cause of pyorrhea alveolaris lies in the so-called 'comforts' of our civilization?" he was showing that pyorrhea was the penalty for the violation of a natural law.

When we study the oral hygiene movement in its entirety we will find the cause that calls for this oral hygiene effort in the "so-called comforts of our civilization."

The question of getting the information this oral hygiene movement has to give to the public, in the most effectual and expedient way, so there may be no, or the least, sacrifice of professional dignity, and still remain in a legitimate and effectual position for its prosecution, certainly is a question of the hour. For the opinion the public has on oral hygiene at present, the dental office is almost wholly responsible; for whatever errors there may be in this opinion, the office is likewise responsible. Past experience in health movements, in both medicine and dentistry, points out the office, as not only the logical, but the legitimate place for the teaching of all health movements. The office is the place where the person is instructed and convicted, and it is always the convicted person that carries the instruction to others, and delivers the conviction with the instruction. Until the office has exhausted all its resources for conveying this information to the public, the effort outside the office in oral hygiene will fall short of what it would otherwise accomplish.

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*Read before the Northern Indiana Dental Society, 1913.

The dental profession has "groaned loud and long" because it has not been recognized on health boards and inspection committees, etc., equally with the medical profession. It will be obliged to keep up this "groaning" unless it takes seriously such advice as Dr. William Hunter gives when he suggests "a spread among dentists of a knowledge of sepsis."

When Dr. Charles H. Mayo, in his paper before the Chicago Dental Society, said: "The next great step in medical progress in the line of preventive medicine, should be made by the dentists," he suggested that a chair dealing with oral sepsis and its influence on the general health should be established in every dental college; that mouth bacteriology should receive its required attention; that especial stress should be laid by colleges on the fact that collar crowns, collar attachments and fixed dentures are always to be regarded with suspicion as being possible producers of pathological conditions; that, by some means, everybody that now is in the active practice of dentistry, as well as all those yet to come to its ranks, must be made aware of the fact that an anemic, rheumatic, neurasthenic, diathesis, from whatever cause, as well as all persons afflicted with any kind of digestive derangements: gastritis, appendicitis, colitis, kidney disease, heart lesions, liver complaints, melancholy, etc., present contraindications for any kind of dental work that might engender sepsis.

Dr. Mayo's statement suggests, as well, for the good of humanity and the general uplift of the profession, that when the opportunity offers, for any one who can, to use his influence to secure the enactment of a law in every state of the Union, such as was enacted in Iowa, providing that when a dentist advertises painless dentistry, he must "deliver the goods" or be amenable to the law which provides a penalty for fraudulent representation.

Present-day dental literature is teeming with good things regarding the importance of a clean, healthy mouth, and methods and things to do to reach this end. If present-day dental literature would devote effort along the line of dental practitioners' exercising comprehensive judgment on the subject of physical diagnosis, the oral hygiene movement would become more symmetrical. In examining catalogues from nine different dental colleges, the writer has the pleasure of saying that a material step forward has been made in the treatment of physical diagnosis before its student-prospective of the college term 1913-14. This is a good thing. "Nothing better, only more of it."

Upon the digestive organs and the process of digestion, the dentist should be equally or better informed than on the subject of dentistry. For the dental student and dental practitioner alike to make themselves thoroughly conversant on a normal digestive organ and a normal process of digestion, is essential. The healing professions know more about disease than they do about health; therefore, the world of inconsistencies in any health movement. To know that the digestive fluids, saliva, gastric juice, pancreatic juice, bile and intestinal juice all co-operate under an established law to separate nutrition and refuse that the nutrient portion of the food may be absorbed; to know that saliva converts starch into sugar; that gastric juice not only softens the solid food, but produces a great chemical change in the proteids; that the pancreatic juice changes proteids to peptones, thus completing the action of gastric juice; that the chief use of the bile is to aid in the digestion and absorption of fats; that the intestinal juices assist in bringing about an alkaline condition in the small intestines and aid in the reduction of cane sugar and maltose to the simple sugar, dextrose and levulose, is essentially important.

When Dr. Arthur D. Black said, "the deposit on teeth evidently occurs as a result of a lack of balance between the quantity of food taken into the system and the eliminative processes," the writer wondered how many of the dental profession would stop and notice what a telling utterance this statement is. Listen! "The deposit on teeth evidently occurs as a result of a lack of balance between the quantity of food taken into the system and the eliminative processes." Gentlemen, think! The importance of a knowledge on the subject of excretions cannot be overestimated. To know a healthy lung, skin, kidney and large intestine, together with a normal excretion from each, is a subject much overlooked by the dental practitioner, much to the limitation of his efficiency. By this statement Dr. Black suggests that if there should be any difference between the medical and dental practitioner in the matter of knowledge on the subjects of urinary and fecal examination, the dental practitioner *should be the better informed*, and if Dr. Mayo's suggestion is of any significance when he suggests "the next great step in medical progress," it is essential that dental practitioners should know a healthy or diseased kidney, that he may ascertain the condition of the blood as it is related to such maladies as intestinal autointoxication and diabetes, and that his knowledge of fecal excretion may give him ample judgment of digestive disturbances.

The impression is apparent in the oral hygiene movement that if the public's mouth could just be placed in the hands of the dental profession, all existing lesions, as well as all those yet to come, would forever be banished and nothing but the return of health be forevermore.

With the removal of the number of bridges, crowns, etc., that have been inimical to health, and which are consistent with Dr. Hunter's terms for them "gold traps of sepsis" this impression does not harmonize. The instances of digestive disturbances where there is a healthy mouth prove to the public that all derangements spoken of by the publicity movement do not come from bad mouth conditions.

Dr. C. N. Johnson once said, "he who, by his hands or by his means, helps a weaker fellow, and thereby increases his efficiency in life, has built better for the future of humanity than he who, by glare of trumpets, takes a kingdom."

At Battle Creek, Michigan, it requires more than a million dollars a year to run that institution. Four thousand patients were treated in the year 1912. One thousand one hundred and fifty-two for digestive derangements due largely to bad mouth conditions and bad habits of living. What is true of Battle Creek is true, largely, of similar institutions.

The oral hygiene movement bemoans the lack of care the poor are suffering with their neglected mouth conditions; and say not a word of the man, who, in his "mad rush for wealth" accumulates millions at the expense of health and then rushes to the sanitarium and spends it at a fabulous rate to regain what he had ignored as a thing of value.

If good health and good habits could be instituted with this "mad rush for wealth" class, so they might with their "hands" or "means" help a weaker fellow, certainly a more symmetrical oral hygiene movement would be the result. How many of this "get rich quick" class apply to the dentist that they may get relief, only to have their mouths filled with caps, gold crowns, collar attachments, fixed dentures, in the language of Dr. Hunter, "gold traps of sepsis," thus permanently confirming their invalidism?

Not for anything would we detract from the publicity oral hygiene movement in any way whatever. Get the man in the office all right, first in his comprehensive judgment of what relation dentistry holds to social economics; second, get him to feel that in his office a sane, sound, consistent doctrine is to be practiced and taught before a public can be convinced that there is a seriousness to the oral hygiene movement that really makes it necessary for everybody to know.

Change the septic dentistry that is done today as it comes from the hands of the profession into thoroughly aseptic services and the publicity oral hygiene movement would not find the doubt and opposition it now encounters.

Dr. W. G. Ebersole says, "1,500,000 Americans are dying annually, 600,000 of whom die from preventable diseases; there are 3,000,000 people sick in the United States at all times which entails a tremendous loss; of the 92,000,000 people in the United States 88,500,000 are in need of dental care, treatment or advice."

My home county, Montgomery, Indiana, is about an average county as regards the number of practicing physicians and dentists. There are 110 physicians and 20 dentists. At an average of $150 per annum our county spends $200,000 yearly. There are 92 counties in our state which would make for Indiana alone nearly $20,000,000 annually. This says nothing of the sanitariums, of the state hospitals, and people who go out of the state for treatment.

Have you ever thought of how much inefficiency of citizenship this means? And more yet—does it not look like some one should "get busy," and who more than the dentist when it is in his power to prevent much of this invalidism and inefficient citizenship?

DISCUSSION.

Dr. F. A. Wildason: First I wish to congratulate Dr. Ream on his good paper. While we may differ on some points, in the end it is all for the good of the cause. In discussing this paper I wish to bring out another side of oral hygiene, which the essayist has only mentioned briefly.

Oral hygiene is or should be a subject of vital importance to every dentist, and I can only emphasize that the office is the best place to promote the oral hygiene movement at this time, by teaching the patient how to keep the teeth and mouth clean, and by doing such dental work that oral sepsis will be impossible.

Dr. Ream refers to the branch of oral hygiene pertaining to faulty dentistry and local septic conditions, due to a lack of proper care and use of the teeth, rather than giving a method of treatment and instructions whereby these conditions are prevented instead of calling for corrective treatment.

My version of oral hygiene is not only to avoid septic or faulty dentistry, but also to teach the adoption of a method of mouth cleanliness that will prevent such deplorable conditions as we often see in mouths, which call forth such criticisms as that of Dr. William Hunter.

We miss our calling when we allow the public to go on and on in ignorance, until they become anemic, rheumatic, as well as inflicted with the other diseases referred to in Dr. Ream's paper, when it is within our province to assist in the prevention of such conditions. It is a duty that we owe to humanity to inform each and every patient that a clean tooth will not decay, and a clean, well-cared-for mouth is the greatest prevention for tuberculosis and the many ills that prey on those of low vitality.

Before the publicity campaign, which is now in effect in many places, can or will be adopted universally, all dentists must feel the importance of their cooperation, as well as their obligation to the public. The dentists should become live wires in their community, and their competitors will in time fall in line. At this progressive age there is scarcely a man in any trade, profession or calling who will be content with standing still. If he fails to fall in line, he will soon be lost sight of, and the world will be better off.

If the timely suggestions offered by Dr. Ream were generally adopted by the dental profession it would hasten the day—that day toward which all dentists who have labored so zealously in the field of oral hygiene look as their goal.

The rapidity with which the oral hygiene propaganda takes on proportions and is generally accepted by the public depends largely if not wholly on the individual dentist, acting as a unit of the whole—in conjunction with each and every dentist in his community. As to the success of the oral hygiene movement, that depends on the individuality, the perception and intuition of each individual, and whether or not he wishes to embrace the opportunity at hand for doing good.

As charity begins at home, unquestionably the office is the place in which to educate the public to the needs of the hour, the importance of oral hygiene in our home and schools.

Why is the dental profession not recognized on health boards and inspection committees? The answer is obvious. Why do we receive the deaf ear from our legislature when asked for the adoption of dental inspection in our schools? Because the average dentist is not ready, capable nor willing to give any time to this subject. Whenever the dental profession can show the legislature, of this and every other state in the Union, through practical demonstrations, the necessity of oral hygiene in our schools and homes, backed up by the demand of the public, then, and not until then, will we have such laws enacted that will safeguard our posterity from many of the physical and mental defects, as well as the ills peculiar to childhood. Then we would have the foundation laid for a stronger nation morally, mentally and physically.

Too often we pursue the rainbow while we overlook the little things which in time prove the essentials for a successful culmination. In our effort to do big things, too often the cart is placed before the horse.

It is my custom to preach the gospel of mouth cleanliness to those who will give ear. Some good results have been obtained where least expected. I respect neither age, sex nor position, and I trust that good seed has been sown on fertile ground which in time will yield abundant fruit.

No good cause has ever been accepted or adopted without personal sacrifice. We must put our shoulder to the wheel and in the language of our immortal Longfellow,

> "Let us then be up and doing, With a heart for any fate;
> Still achieving, still pursuing, Learn to labor and to wait."

If it be true of the Marion School at Cleveland, Ohio, that a given number of "left overs," "incorrigibles," "fit subjects for the Juvenile Police Court and the Reformatory," can be so transformed into good students, well-behaved boys and girls, with an average increase in their school work of 98 8-10 per cent. by the adoption of oral hygiene and medical inspection—whether the figures be scientifically true or not—the fact remains that the working efficiency of man would be correspondingly increased by the introduction of oral hygiene and dental clinics in the factory, at given points on railroad systems, in the mines, large stores, etc. It may be beyond our fondest hopes to be able to increase the working efficiency of the adult 98 8-10 per cent., but it is possible by the adoption of oral hygiene universally, and religiously adhered to, in every vocation in life, that the working efficiency of man could be increased on an average of at least 25 per cent. above what it is at present, resulting in a greater physical comfort, a healthier race, a people with higher ideals, with an intellectual and moral standard the highest that has ever been attained in this or any other country from the beginning of time.

With your permission I will diverge just a little, but promise to keep within the province of the subject. In the mechanical and scientific world efficiency has been the object most sought. Great corporations and men of big business recognize the efficiency of machinery over the average man. It is true man is growing weaker, due to our modern method of living and the mad rush for wealth. But, if he loses his health and shortens his life in the swirl, can we say that he is growing wiser? The employer, regardless of the kind of business, measures man power on the scale of efficiency. You see only men of brain at the head of big business, commercial and manufacturing enterprises; why? Because they are efficient. Man is no bigger than the position he occupies. At best, man is only 50 per cent. efficient.

Much has been accomplished along the lines of welfare work, by adopting dental clinic and oral hygiene methods, in several large commercial and manufacturing establishments. Nelson Morris, of Chicago, in a recent statement says that they have increased sobriety 30 per cent. by installing dental clinics and teaching their employes mouth cleanliness, and further states that the increase in efficiency and steadiness is far beyond expectations. In Pittsburgh, Pa., a large manufacturing establishment installed a dental clinic and gave instructions on the use and care of the mouth and teeth. The plan was first started as an experiment. The results were so gratifying that a modern dental clinic was permanently installed with competent men in charge.

Broad-minded business men are awakening to the possibilities of increasing the efficiency of their employes through the adoption of these methods. It may be philanthropy; it may be a selfish motive; and possibly it is plain to them that they will be able to coin the increased efficiency of man into dollars. However remote this may be, yet it may be true. Better the physical condition of man and you better his social condition, which in time will result in a more congenial relation between the employe and the employer.

The road leading to the possibilities of what I have said in discussing this paper on "Promoting Oral Hygiene" is not strewn with roses. The results sought are possible, and will in time come to pass; that depends on how long the dental profession will remain in its present lethargy. Very little can be done in educating the parent, and especially those who are born and reared in some foreign country; but in our public schools such lessons can be taught both by precept and practical demonstration that will make an indelible impression upon their young minds that time will not erase.

I pray that the dental profession will take hold of this proposition and be able to show the next General Assembly, by practical demonstration, the practicability, the importance and the necessity of the enactment of such laws as will make it possible for the medical and dental professions to carry on this great educational hygiene movement, safeguarding the human race.

God speed the day when oral hygiene will be taught and practiced in every dental office and school in this broad land.

Dr. J. W. Stage: It seems hardly worth while for me to say a few words in the discussion of this splendid paper of Dr. Ream's after having followed the able discussion of Dr. Wildason. Dr. Ream has given us a very satisfactory paper and has covered this subject very thoroughly. I don't know that anything I can say will add to the value that has been brought out and the points he has made.

Dr. Ream, in his paper, makes a splendid appeal for the dissemination of knowledge to the general public along the line of oral hygiene, every point of which I agree with—practically everything that has been said by the essayist.

It is pretty hard for me to disagree with a paper of this kind, dealing with facts, which the profession of dentistry today recognizes as one of its active lines; on the other hand you cannot get very much discussion out of a paper which you believe and firmly agree with; and from my own standpoint and from experience I have had in this work I believe that the one great point we have to contend with more than any other point is the fact that we deal with the public from a standpoint of non-interest and lack of knowledge, very often. When you think of that and then think of the dental profession in relation to this movement it might be truly said that dentistry from that standpoint might be considered to be one in its infancy. The growth of the profession generally would bear out that statement, and certainly it would more than bear out the statement along the line of oral hygiene.

I agree with all the quotations the essayist has made in relation to the work that has been done along the line of research movements, and this particular movement of oral hygiene, when, as a profession we recognize what has been done in sort of an experimental way to bring this movement into a position before the public so that they may make demands and in return receive more remunerative benefits directly. We can only think again of that one point which I made earlier that the public, as a rule, in their attitude towards the oral hygiene movement, display their lack of knowledge of the usefulness of this movement. What I mean to refer to more directly will be something like this: we all know what the profession has done throughout the state in our effort to get some assistance in a legislative way. I don't for one minute believe that the actions taken by the legislature were taken in an antagonistic way intentionally, but I do believe it is an act of total depravity in a very great many cases. I do not believe they can understand; I do not believe they grasp the subject to the extent that they figure out in their own minds that it is a good thing and that the laity, the public, will receive the benefit. We have that come up practically every term.

In one school in our own city we have shown in 240 pupils that there are 1,303 cavities that actually needed attention at the time the examinations were made. Now we are confronted with the proposition that the educational board is unwilling to give any assistance whatever to complete the examinations, to show how many more cavities there are in the remaining wards and sections of the city.

Now, I do not believe in my own heart those men do that because they believe they are doing a good thing, but they do not understand that if they did stand behind the movement and give some assistance that the returns to the public might be manifold. Call it total depravity or what you please. When we think of the demands made on our profession along this line and other lines I want to repeat that I believe in very many cases the profession is practically in its infancy, and the advance dentistry has made in this and other lines in the last few years will certainly be more than multiplied in an equal time to come.

I believe that it will lead to lines of specializing. I cannot see any other way for it. When you practice a profession in the way you might dream of practicing the profession of dentistry, and expect one man to be entirely competent on the various lines, I think you are expecting too much. To be proficient and up in a position, as the leader in discussion has mentioned, to be able to give the greatest amount of efficiency, there will have to be, necessarily, a specialization along certain lines.

When you stand in your office and examine a desperate case of neglect along the line of oral hygiene, and explain to a particular patient the points covering the field of oral hygiene, and impart a few things by which they might be relieved to a very great extent of their distress and their ill health—when you use your time along that line, I believe you have covered, to a very great extent, the appeals made by the essayist. I do not see how a man can reach the public any better, and I find, and I believe every one else has found, that in very many instances a higher state of appreciation will you receive from your patients when you can intelligently explain to them a few of the essential points which will lead them to maintain a more cleanly oral cavity. Revert your mind to some particular patient who has come in great distress, and has been in misery and pain, perhaps loss of sleep, and loss of sleep and of rest will create loss of time. Impart a few simple propositions to this patient, cleanse his teeth thoroughly, tell him how he can keep them in something nearer an aseptic condition, and if he has the kind of intelligence most of them have today you will see a very marked appreciation.

I do not know that I can add anything more to what has been said along this line. I try to do my best in promoting the oral hygiene movement. It seems to me that it is at least one of the greatest lines we have to work out today to put this matter in shape so the public can receive and will receive the benefits they should from this movement.

It is not clear to me and I cannot satisfy myself exactly what the outcome of this will be, and how it is going to be handled as far as the school movement in particular is concerned. It is not clear to me how this is all going to work out. The plan is a good one, and I think we can all do a very great amount of work in oral hygiene in the schools, but we meet with obstacles, as has been said before, and we will have to work long and loud and hard to overcome all these obstacles before this movement will become perfect. I haven't any plan I wish to offer.

Dr. Nesbit: The question of oral hygiene and especially the publicity of oral hygiene is very dear to my heart. Some of you have heard me say that if you wait to present oral hygiene to your adult patients as they come to your office you are not going to get very far along with the work. Oral hygiene means habits, care of the mouth, care of the body and care of any part or organ in the body. Habits of living are fixed early, and we that did not learn to scrub our teeth when kids are still carrying around rotten mouths in spite of the fact that we know about the detriment it is to us. I believe if you want to succeed in doing the most good along this line you must begin with the children, public school children, and the earlier you begin with them the better.

I want to call to your attention another thing and I do that as District Doctor for the State Tuberculosis Society, and that is there is work for the dentists in other lines than in their offices and in their dental societies and in their dental charities. You must become interested in the fight against tuberculosis in your community; you must become interested in more than that, you must become interested in all the social questions in your community. All these questions are questions that go with oral hygiene, and cannot be separated; there is no separation. In tuberculosis alone we have given Indiana fifteen million, and we haven't been able to do very much toward getting resident dentists needed to take care of the teeth and mouths of the people we are taking care of at our state sanitariums.

I visited the feeble minded school last week—they have a resident dentist now. This is the first year, and they are doing amalgam filling, and doing some prophylactic work. I asked them to furnish me with an estimate of what it would cost to put one of the patient's mouths in condition. I got a statement the other day that it would be worth about sixty dollars. Now, can you compare the benefit that institution is going to do that patient if her mouth needs sixty dollars' worth of work? They have had this patient seven or eight years.

I enjoyed the paper and I heartily agree with the things the essayist said. I am glad to be with you. In our little city we have a set of dentists we are proud of. The boys come over to school and they give up half a day of their time and nobody has thanked them or offered them a cent. Whenever we send for them they come, and when we want to send them a patient the teacher writes a note and tells the pupil to go over and get his mouth fixed up. We haven't got very far yet. Thirty-six per cent. of our children have no cavities in permanent teeth. We have gotten that far, and it is better than when we started out. A good many of our children are interested in their teeth. I don't know whether it is the fear of getting a grade card with a few cross marks on it indicating some cavities or not. The children have taken a great pride in getting a clean dental examination slip. I don't know just what the motive is, nor do I care, since the children are taking an interest in keeping their teeth clean.

Dr. Dinwiddie just called my attention to the fact that our records last year showed a loss of 149 permanent teeth from extraction against 178 the year before. There has been a lesser extraction of permanent teeth last year than has been going on.

DR. REAM (closing): I have very little to say or add to what the gentlemen have said in discussing this question. Dr. Nesbit touched one phase that is especially vital relative to getting this matter to the people when he said that—I believe it was at Valparaiso—they had difficulty in getting the people to understand what the real meaning of this movement is. Those were not the exact words, but in substance. Now, I have contended for a number of years that there is a certain fact with which most dentists are not familiar, and if you have read Dr. Nodine's paper which appeared, I don't know now in which magazine it was, in which he said that the streptococcus and staphylococcus find their way into the blood by five different routes; the first is through the lymphatics and the second way it will find its way into the blood is through a mouth where the mucous membrane has been broken down; the next one is through the tonsils; the fourth the intestinal tract; the fifth is through the lungs.

The first of all is this: until we, as a dental profession, recognize that our services should, of all things, be septic, we will never come to terms where we can convince the public we are really a part of the medical profession. I believe it was Dr. Hunter who said there was one profession struggling with might and main to overcome sepsis and another that was industriously engaged in promoting the evil of sepsis. He referred to dentistry.

I procured from the Chicago Post-Graduate School the privilege of making slides from pictures, a series of which I think most dentists are in possession of, showing the jaw and tooth development. That gives the patient an adequate idea of what Dr. Nesbit spoke of—you get at the child in his youthful state. Now, here is the point: I believe that we have first got to get the adults in some sort of a way imbued with such intelligence as will permit us to get next to the child, and until we are successful in breaking down that barrier we still have obstacles to overcome and will meet with failures just as long as they last. The next slide I had made I was successful in getting the impression of the same patient's mouth at four years old and then at eighteen years old. This slide added to the ones that the school permitted me to use formed a very satisfactory combination to teach this particular point to the people. Then, along the line of natural neglect of the mouth, and those that are acquired through inefficient dentistry, through oral septic surgery on the part of the dentist. Then we come, of course, to Dr. Nodine's statements where he speaks of the things I have enumerated to you, and last, of course, we come to a series of slides touching the subject of physical diagnosis.

I believe, as dentists, we are really back on that particular subject, and the fact that the dental colleges are making an especial effort to impress that on the coming students is indicative that the colleges recognize that fact. Many a time a patient has come to your office, a little boy or a little girl, and if there is a streak of human sympathy in your heart you have felt sorry for that child when you looked into its mouth and found cavities and sore gums and conditions where the poor little boy could not chew anything or masticate his food.

There are many things I would like to say along this line, but you have been very patient with me. I wish to finish with passing to you a number of little sheets I hand to each patient. If you will excuse me a minute I will bring them in and distribute them. (Dr. Ream will gladly supply copies of these sheets to all who are sufficienty interested to write for them.)*

Dr. E. I. McKesson: I am not a dentist but an M. D. This oral hygiene movement reminds me a great deal of the anti-tuberculosis movement you hear discussed in every medical meeting.

Now, in looking over a pamphlet here, a reprint from *The Evening Messenger* from Valparaiso, it says that the per cent. of pupils with no cavities is only thirty-six. The number of pupils examined 1,013. Now, of the thirty-six per cent. of pupils having no cavities what is the per cent. of tonsilitis in those patients or those pupils as compared with those which have cavities? I want to ask that question. It may be worked out, it seems to me.

The point I want to make is this: it seems to me the dental and medical professions should get together. How many dentists attend medical meetings? How many physicians attend dental meetings? You will hear some papers in a National Medical meeting along these lines, but in the county societies I still have the first one to hear, and I have attended many. It seems to me the medical profession needs education; in fact, I know the medical profession is just about as ignorant as the laity on this very subject. What we ought to do is get together, the medical men and the dental, and discuss the thing. It seems to me it is a case that ought to show the relation between the teeth and tonsilitis. Then we can take the whole line of diseases that originate from the tonsils. Take inflammatory rheumatism—what does that lead to? Intercarditis, permanent disability that may go through the entire life of the patient. Where do the tonsils get this infection? I would like to know if this has been worked out? Possibly it has and some one can give us the information.

I think the medical profession would be glad to know a few things the dental profession has already worked out. What we ought to do is get together and hold meetings. Let us come to yours; let us have a mixed meeting once every three months or something of that sort. We have started that in Toledo. We had one meeting last fall; it was a very good meeting, and it was well attended by both professions.

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*We present on following page a copy of the sheet referred to by Dr. Ream. We cannot too highly commend its use by all dentists interested in the advancement of his profession and the welfare of the public.—The Editor.

(COPY OF SHEET)

"I believe that the problem of nutrition will be settled within the first three inches of the alimentary canal."—*Horace Fletcher.*

INFORMATION RELATIVE TO THE CARE OF THE TEETH AND MOUTH

By Dr. E. W. Ream

1. Health or disease finds its way to the body through the mouth.
2. Hard foods well chewed and thoroughly mixed with saliva help to make and keep good teeth. Vigorous chewing of *hard* foods is a better cleaner than the artificial cleaning.
3. Soft foods stick to the teeth. Hard foods do not.
4. A dirty mouth makes bad breath. A clean mouth helps to make and keep a sweet breath.
5. If food particles are left on the teeth they decay. A clean tooth seldom decays.
6. Keep the teeth clean on *all* surfaces. The decay begins on the outside. Teeth decay at night more than during the day. *Clean the teeth just before going to bed.* Clean in the morning and after each meal.
7. Brush *all* the teeth, especially the back ones on *all* their surfaces thoroughly.
8. When the secretions of the mouth are normal, a tooth-wash or powder is not essential. Avoid a tooth wash or powder that has a grit in it.
9. Be *sure* that you get *all* the food particles from between the teeth and out of the grooves on the chewing end of the teeth.
10. Brush the teeth with a short pressing sweep from gums to the cutting and chewing ends of the teeth. Above from the gums downward, and below from the gums upward. Brush in every direction over the chewing ends of the back teeth.
11. Wash your tooth-brush thoroughly before hanging it up, and *always* hang it so the sun may shine on it for an hour or more each day.
12. With the ball of the finger and thumb rub the gums each day from above downward on uppers, and from below upward on lowers. Use enough force to stimulate a good circulation of blood to the very *end* of the gum margin.
13. *Never Over-Eat. Never Eat Between Meals. Never Eat at Irregular Hours.*
14. Dr. Arthur D. Black says: "The deposits on teeth evidently occur as a result of a lack of balance between the food taken into the system and the eliminative processes."
15. Read the above over until it is a part of yourself. Practice it and you will escape the dental operations that you otherwise would certainly have to undergo, live longer, be happier, and smile with one of those smiles that "won't come off."

ACCURATE METHOD OF SECURING WAX MODEL FOR CASTING COPING*

BY DR. R. D. RUMBAUGH, CLARKSBURG, W.VA.

The cap is swaged to the base of the porcelain crown. The cap is made of 24 K. gold. The pin is inserted into position with the cap on the base of the crown, and a little hard wax is added to hold the pin in position. The parts are removed and soldered together with a 22 K. solder. The cap and pin are then placed in position on the crown and an impression wax is added and the impression taken with the crown on position on the root. The crown being removed, the impression can be readily detached from the root without danger of fracture or being bent. The wax impression is then inserted and cast in the ordinary way.

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*Clinic at West Virginia State Dental Society, 1913.

TEETH, RELATIVE TO GESTATION*

BY M. K. FORD, D.D.S., AMERICUS, GA.

MY SUBJECT, "TEETH, RELATIVE TO GESTATION," is one that the careless dentist is liable to consider lightly. I find that many of the more commonly-read writers upon dental topics give very little consideration to the subject, and I fear that when I have finished you will think that I have contributed very little to the knowledge of the topic.

I, in common, I suppose, with all other dentists, have noticed that dental neuralgia is a frequent accompaniment of gestation; especially is this the case during the earlier period of pregnancy. Very often it will be found that this grows out of poor care of the teeth, caries developing therefrom. We well know that where facial neuralgia exists it is necessary to pay special attention to the care of the teeth.

I feel certain that we must admit that gestation predisposes to caries, hence the old proverb: "For every child, a tooth." Mr. Oakley Coles, in an interesting and instructive paper on the condition of the mouth and teeth during pregnancy, refers the prevalence of caries to the co-existence of acid dyspepsia, which causes acidity of the oral secretions. We know the old women's notion that pregnant women should be allowed to give full sway to their appetites; while this idea is not quite so prevalent as it once was, still it prevails to a greater or less degree in nearly every circle of society, and as a result, the average pregnant woman eats more than is good for her, and is therefore very likely to be subject to more or less indigestion, with the resultant acidity of oral secretions referred to by me above according to Mr Coles' theory.

There is too much unreasonable dread among us dentists regarding the interference with the teeth during pregnancy, and some of us recommend the shunning of all operations, holding to the idea that filling and extraction should be postponed until after delivery. It occurs to me that suffering the pain of a severe toothache is likely to give rise to far greater irritation and consequent ill effects upon the patient than would an operation that would afford relief. I have many times seen badly decayed teeth extracted during pregnancy with only beneficial results following; I may go further and say that it has been my good fortune never to have had the reverse of the above results happen to patients of mine. I will say in this connection that I have made it a practice to call in a physician where I was in doubt as to the probable results, and this practice has no doubt contributed to the favorable results I have had from trying to always give relief of at least some permanency to patients suffering pain during pregnancy. But it is my idea that only imperative demand for relief from pain should be considered; I never undertake general work, such as can be delayed a few months without serious results.

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*Read before the Georgia State Dental Society, 1913.

Pardon a personal reference to a particular case of mine. A few weeks ago a lady in my town telephoned me to come to her home; I found her suffering from toothache; examination disclosed a badly broken-down bicuspid, abscessed, while her state of pregnancy had advanced some five or six months; she had slept little the previous night, and as a result was so nervous that I could hardly look into her mouth. I made small poultices of antiphlogistine and applied on the inside of the lip next to the tooth; I gave her two doses of aspirin of five grains each and an eighth of a grain of morphine. She rested that night, but the trouble began the next day. I consulted her physician, who discouraged my inclination to extract. She had confidence in me and insisted upon relief being given her; so I went up to her home, opened up the tooth partially, though it was so sore that I did not do so satisfactorily; I found no pus, though the face was badly swollen; I could see nothing else to do except to extract the tooth; I gave the lady a hypodermic of morphine and atrophine, extracted the tooth, and the patient was easy in a few minutes, and has done nicely since.

Dr. Williams, on Obstetrics, says: "It is a general belief that pregnancy predisposes to caries, and that it is probable that the condition is somewhat allied to the minor degrees of Osteomalacia, which occur only during pregnancy." If he is correct, we ought to place the patient on the Syrup of Hypophosphites, or Lactophosphite of Lime.

Barrett's Oral Pathology fails to agree with me as to gestation predisposing to caries. He says that it should be remembered that nutrine changes in the dentine are exceedingly slow, while it is not unreservedly admitted that they take place at all in the enamel. Hence, while the functional disturbances in the teeth are quick to manifest themselves in allied tissue the reverse is not the case and functional disturbances in allied tissues are not quick to manifest themselves in the teeth. A continued fever may cause a great waste in many tissues, but it cannot in the teeth, because there are in the teeth no absorbents, no lymph system; there is no active circulation in either dentine or enamel, through which progressive or retrogressive changes may readily and quickly be wrought. The supposed diversion of nutrine currents from the teeth to the growing child, Barrett contends, is largely imaginary, and there can be no sudden breaking down of the teeth as a result during gestation. Admitting that he is correct, then why is it that we find that teeth decay more during pregnancy than at any other time? One explanation may be in the contention that during pregnancy the woman finds duties and interests to occupy her whole attention, and so too often neglects the attention she has been accustomed to give her teeth, so that food is allowed to remain upon and between them and fermentation does its perfect work. Then the physician often prescribes mineral tonics for pregnant women, and those bring about disastrous results unless more than ordinary care is taken in the taking of such medicines.

It is a fact that a majority of our patients think that a visit to the dentist will result disastrously during pregnancy; then the modesty of the ladies keeps them away from the dental office when their figures are not as shapely as they usually are; so they put off going when their troubles could be nipped in the bud, as it were, and the results are disastrous. The new baby claims attention, he must be duly exhibited to admiring relatives and friends, the lady has to repay the calls she received when she was not going out, so with this time added to pregnancy, it is usually a year that the lady is not in her dentist's chair, unless there be that imperative need—the pangs of toothache; so when we do look into her mouth we nearly always find so much caries that we are wont to think that it must have resulted from gestation. So there is something in the contentions of each class, to-wit: those that say that gestation predisposes to caries, and those who say it does not. After all it is not so important for us to determine which of these contentions is correct; it is far more important for us to determine what to do with caries when it does occur in such form that attending to it cannot be postponed till after pregnancy terminates.

We should strive to inculcate in the public mind the well-established fact that the modern dental office is the place to relieve pain and suffering and not to cause them. If every woman who is pregnant will visit the dentist and place her mouth in his care, he will take special care to avoid causing her pain at such time. This will be true, not so much because the dentist will fear causing immediate hazard to her as because he will think that it is necessary to preserve her nervous and mental equilibrium to as great an extent as possible. If we find cavities that will likely give trouble before delivery, the cavities should be filled with plastic material; if there be cavities too far gone for filling and likely to cause trouble, we should extract the teeth containing them at once.

We know there is more toothache during gestation than at any other time. In many cases the toothache is largely due to sympathetic disturbances rather than to tooth-lesion. Seldom is it that the patient can be convinced that this is true, yet it is our duty to insist that the physician shall take charge and give the patient such treatment as he deems best for sympathetic membranous and nervous troubles.

CASTING METAL FORMULA*

BY DR. FRED E. HESS, FAIRMONT, W.VA.

Formula: Gold, 88 per cent.; platinum, 5 per cent.; paladium, 4 per cent.; pure silver, 3 per cent.; copper, 5 per cent. With this formula of metals there is no expansion or contraction in the finished cast. You can get a desirable color and a very sharp margin. This formula can be cast directly against porcelain.

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*Clinic at West Virginia State Dental Society, 1913.

ALVEOLAR PYORRHEA*

BY R. CHASON, D.D.S., COLUMBUS, GA.

I SHALL NOT ATTEMPT to bring you any new message regarding the etiology of pyorrhea, but shall confine my few remarks to its therapeutics.

To begin with, I want to say that I do not presume to cure every case of pyorrhea alveolaris that presents itself to me. I have no cure-all panacea for this disease; and if there is one known. I do not know what it is. I would like very much to know.

The term pyorrhea alveolaris, which from the entymology of the word should signify a specific morbid condition, is in reality applied by the profession generally to a great variety of disturbances of normal tissues about the jaws. This term has become so generally used by the entire profession that it would be folly to attempt to change it.

The first essential in the treatment of this disease is proper diagnosis.

There are so many different conditions presenting in different cases which are due to distinct causes, that we must know exactly what the conditions are in a given case before treatment can be intelligently undertaken. For instance, in some cases, the cause may be wholly of constitutional origin, or in addition thereto, there may be a local irritant present, or it may be entirely due to local infection or other local causes.

The trouble in a given case may be due primarily to local conditions, such as overhanging fillings, ill-fitting crowns, poor contact points, and the like, which must be corrected before curative treatment should be attempted.

Auto-intoxication plays a small part as a causative factor in many cases of this disease. In this class of cases systemic treatment is the first essential, accompanied by local treatment which in itself alone would never effect a cure.

Careful attention to bodily hygiene—with special reference to diet—will greatly assist the treatment. All patients suffering from any manifestations of this trouble can be greatly benefited by careful diet, eschewing meats and sugars. The drinking of large quantities of good, wholesome water greatly facilitates the treatment.

Again, we should give the patient the proper amount of encouragement (not over-stimulate him with it).

In attempting to treat a case of pyorrhea we should put forth just as much effort as we do for filling or any other operation. We should have our appointments just the same—not say to the patient, "Come in in a few days and we will do what we can for you."

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*Read before the Georgia State Dental Society, 1915.

Right here is where the patient is educated not to appreciate the value of the services of the dentist.

Now, the actual management of cases requires first, that we determine what is actually taking place in a given case: find out the cause, explore accurately the extent of the pus pockets, how much peridental membrane and alveolar wall is involved, how much necrotic tissue is present, and what the exciting cause—also whether there are any loose teeth. The next step in order is to properly clean the teeth, and here the majority of us most often fail.

The requirements for properly scaling the teeth are proper instruments and thorough finger training, in order to use them effectively. A delicate sense of touch —acquired by practice— is expedient to do the work.

For sealing, I use Ivory's and Marshall's scalers—with other ordinary scalers and chisels. Instruments must be delicate, so shaped as to reach every surface of every root and work with both chiseling and pulling motions, and be stiff enough not to spring over the deposit without removing it.

Concentration of effort on one particular tooth until it is thoroughly clean is absolutely necessary, so that there will be no necessity for again tearing up the tissues around that particular tooth. But, before the scaling is begun the mouth should be cleared of all filthy mucus and debris antisepticised.

The pockets should be freely syringed out with an antiseptic solution during the scaling process, that all dislodged substances may be thoroughly removed.

Where the pockets are deep and difficult of access—in order to avoid lacerating the tissues too badly—pack the pocket with gauze (or cotton) saturated with aromatic sulphuric acid, 25 per cent. phenol sulphuric acid. This packing should remain for at least twenty-four hours, after which time the gum will be pushed away from the tooth so that the scaling can be easily performed.

In order to reduce the pain incident to scaling, pack the pocket with a rope of cotton, saturated in a one-per cent. cocain adrenalin solution and allow it to remain five minutes. Of course, keep absorbent cotton packed around the tooth to keep it dry and to keep any excess of the anesthetic getting to the throat and other tissues.

After the tooth is cleaned and the pocket thoroughly washed out, apply to the pockets lactic acid, aromatic sul. acid, 20 per cent. trichloracetic, or 20-per cent. phenol sulphuric acid. This should be forced into the deep pockets.

If, after scaling, the neck of the tooth is very sensitive, use chloride of zinc, 20 per cent. in tinct. of iodine.

The treatment should be given every second day for ten days or two weeks, and then every third day or twice each week for a few weeks, and then three or four times for a month, etc.

Have the patient massage the gums frequently. This you will have to teach him. Prescribe a mouth wash to be used daily, even while you have patient under your charge, and have him keep it up afterwards. Strict cleanliness is obligatory. Where there is considerable recession of the gum tissue and the necks of the teeth are quite sensitive, Phillips milk of magnesia is very good to allay this.

When teeth are very loose in the sockets, ligating or splinting, to produce surgical rest, is very necessary before beginning the surgical treatment of them. This splint should remain until the treatment is complete in order to allow the tissues to reattach themselves to the tooth.

Sometimes the removal of one root of an upper molar tooth is necessary where it is entirely exposed.

Now, in conclusion, I wish to urge upon you to be ever on the lookout for this disease and learn to recognize it early when treatment will bring most certain results. When these cases become far advanced, unless very favorable general conditions are present, treatment becomes very difficult and the prognosis discouraging.

METHOD OF MAKING GOLD CROWN CAST CUSPS*

BY DR. W. E. H. CALDWELL, WHEELING, W.VA.

The construction of this crown is simply to show the ease with which the band may be fitted so as to occupy the position normally occupied by the enamel and thereby being better tolerated by the tissues; the ease with which the contact point is restored and the ease with which the proper occlusion may be acquired.

After the band has been properly fitted and the contact points taken care of, I place a piece of inlay wax over the band and have the patient bite to the normal occlusion In addition to this I have him move his jaws as though he were masticating food. The wax is then chilled, the band and wax removed carefully, and the patient dismissed. I then scale the wax from the inside of the band and proceed to carve the cusp, using the highest points in the wax as guides. These I do not disturb. After the carving is completed I invert the band and remove a portion of the wax, shaving it carefully from the inside. This is a very important feature, and unless a certain amount of this wax has been removed, you will find it impossible to set the finished crown on this abutment. The sprue is then attached and the investment made and the casting is carried on in the usual manner. If the cusp has been cast on the band it is not necessary to solder, as the gold in casting will be found to have welded to the band.

The next important step is the finishing of the periphery or the margin of the crown. This must be done in a careful manner so as not to leave any uneven portions or saw-tooth edges, as the tissues will not tolerate a condition of this sort.

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*Clinic at West Virginia State Dental Society, 1913.

BUSINESS·SUGGESTIONS

Our readers are urged to send business suggestions for this department that there may be an exchange of ideas that will be mutually beneficial. Send all contributions to the editor,

L. P. BETHEL, 195 SIXTEENTH AVE., COLUMBUS, OHIO.

THE BUSINESS SIDE OF DENTISTRY

BY "A BUSINESS MAN"

THE DENTIST AS A SPECIALIST

A dentist after practicing a few years will probably find that he is much better qualified along some lines than others; that certain features of his work appeal to him more than the others; that he is better qualified to perform certain operations than others; so, as time goes on, he may become a specialist in his chosen line and be an acknowledged expert in that department. Usually, this will be found much more profitable and more satisfactory and therefore preferable in every way.

The majority of dentists prefer to operate rather than to work in the laboratory, and with our modern dental laboratories making a speciality of doing all classes of mechanical work, a dentist is enabled to delegate that work to experts in that line, and thereby be able to devote his time to something more agreeable and probably more profitable. One must enjoy his work to make it really profitable, and if there is any part of it that is distasteful to him he should eliminate as much of it from his practice as he can, devoting his time and attention to those branches more to his liking.

THE DENTIST'S ASSISTANT

Every dentist should have a capable, neat, proficient and painstaking assistant. He may not be able to afford one in the beginning of his practice, but he cannot afford to be without one after a practice will admit of his keeping one. An assistant should be all that the title implies—he should be able to assist in operations; be on hand to answer the telephone; meet people coming in; arrange for appointments; keep the room in perfect order; keep track of appointments and look after their fulfilment; assist in making collections and in a multitude of ways cause his services to become invaluable. This is particularly true where two offices are maintained in adjoining rooms, for with a thoughtful and efficient assistant a dentist's time may be fully occupied by productive work, the assistant looking after all minor details which would otherwise consume as much or more time of the dentist himself. In this manner the assistant makes his time as valuable as that of the dentist himself.

I consider that it is especially beneficial in many cases for a young graduate to associate himself for a year or two as an assistant to an older and successful practitioner. While at college (as good as they are) a man does not get all of the experience that he should have nor that he will get in an office if associated with the right kind of a man, and the experience, therefore, will be very beneficial in many ways. When such an assistant opens an office for himself he will be a much broader and better-equipped dentist, and the business experience that he will gain will be of inestimable value. He will be better equipped professionally and financially than the average man who enters immediately upon a practice after being graduated from college.

THE DENTIST'S RECREATION

A dentist should have some sort of recreation, determined by his temperament and his financial ability. Some get their recreation in one way and some in another, but a dentist should take a half day each week for out-of-doors or at least out of office and devote that time to some good healthful exercise that will bring into play all of the muscles of the body. One will accomplish more in a week by such a course than by devoting all of the time, without the recreation, to his office.

I do not feel that a dentist or a man in any other walk in life is justified in taking extended trips or other form of recreation unless he can do so without feeling the financial drain. Better wait until in better financial condition and take recreation in a less expensive manner in the meantime. Recreation may become a dissipation and in many respects it is a very expensive dissipation at that; for, when one whose income is determined by the hours that he puts in, is not at work, he not only loses the amount spent but what he might have earned at work. Of course, one can be governed in this as in all other things by conditions and circumstances, but the tendency on the part of a good many seems to be extravagance in his recreation as in other forms of expensive living. A dentist requires and should have sufficient recreation to keep him in the best of physical condition, but this can be done in a comparatively inexpensive manner if so desired.

REINFORCEMENT OF A LOGAN CROWN*

BY DR. D. C. CLARK, BLACKSVILLE, W.VA.

Two methods of reinforcement of a Logan crown:

First—Grind the root down as usual. Fit a band around the end of the root, and then solder a cap on this band, place this cap on the pin of the tooth and put the tooth and cap both on together.

Second—Root ground same as above. Fit a plain piece of 22 K. 30 G. gold on the end of the root, and put the pin of the crown through this plate and into the canal.

*Clinic at West Virginia State Dental Society, 1913.

EDITORIAL

ATTEMPT TO RENEW CROWN AND BRIDGE WORK PATENTS

PROTESTS SHOULD BE MADE AT ONCE

On March 30, 1914, Mr. Britten, of the House of Representatives of the United States, introduced the following bill, which was referred to the Committee on Patents and ordered printed:

Sixty-third Congress, Second Session, House Rule 15194

IN THE HOUSE OF REPRESENTATIVES

A BILL

To renew and extend certain letters patent.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That certain letters patent for an alleged new and useful improvement in dentistry, dated March fifteen, eighteen hundred and eighty-one and numbered two hundred and thirty-eight thousand nine hundred and forty, granted to James E. Low, be, and the same is hereby, renewed and extended to James E. Low for the term of seventeen years from and after the passage of this Act.

This is an attempt to renew the Low Crown and Bridgework patents which, if successful, would not only be detrimental to the dental profession, but to the public as well Dentists everywhere in the United States should make a vigorous protest, individually and collectively, and make it, *at once.* Write to your representative in Congress to oppose the measure, for in so doing he will be acting in the best interests of the public and his own as well. All component and local dental societies should pass resolutions of protest and forward these to their representatives, and all state societies that can do so should make a protest. There should be a veritable "shower of letters" to congress protesting the passage of this unjust legislation, for all dental process patents are unjust. The dental profession is now well organized and a combined effort to defeat the measure will have great influence.

The number of the bill is H. R. 15194.

Dentists everywhere *get busy at once and flood* congress with your protests.

PROFESSIONAL ASSISTANCE FOR THE RECENT GRADUATE

The Ohio State Dental Society is going to undertake a new movement, that of assisting newly-graduated dentists entering the profession in Ohio, following the suggestion of Dr. W. C. Graham, of Lancaster, Ohio. At its recent meeting the Ohio State Dental Society took action in the matter by appointing a committee of which Dr. Graham was made chairman. The plan in brief is as follows:

Immediately after a graduate has received his license to practice, he is to fill out a blank form giving name and address, college from which he graduated, date of graduation and license number. Also in what city or town he intends to locate in the state. This he sends to the dean of the college from which he graduated. The dean sends these forms to the chairman of the Ohio State Dental Society committee. The committee will then notify the secretary of the component society in whose jurisdiction the graduate wishes to practice, using the following form:

FORM B

.............................191..

To..............................Secretary of

....Dental Society

(Component of the State Dental Society)

Address ....

SIR:—

DR..

(Name of Student Graduate)

Graduated by..............................Dental College desires to locate in..............................for the practice of his profession. We hope that you and the members of your society will extend to him professional courtesies, and where possible turn over any overflow work that you, in your several respective practices, can see fit so to do. We hope that you will take him into your society, and in every way make him feel that he is enlisted in the great cause for the betterment of humanity.

Yours very truly,

If this is carried out the worthy young dentist will find himself immediately among friends who, in one way or another, will give him assistance. He will be surrounded by a good influence and an ethical atmosphere. His brother practitioners will be his friends instead of his enemies and he will profit by the mutual good will and fellowship. In commenting on this plan, Dr. Graham said:

"It will be seen that the graduate entering the profession will be welcomed by those co-workers already established, and a friendly relationship will be assured, and the young man just entering the work will feel that he is truly enlisted in a great work for humanity, because the hand of brotherhood is extended to him the very moment he is qualified to enter their ranks.

"This 'Big Brother' idea, this spirit of helpfulness, has been used by a number of dentists over the state, when they would assist a graduate for one year, turning over all their overflow work to him, and now the systematic efforts of the state society will insure to every graduate of Ohio colleges like consideration.

"And this helpfulness is not confined to Ohio colleges, but to all graduates who wish to practice in Ohio the same consideration will be granted; all they need to do is to notify the chairman of the committee, stating their authority to practice, and naming the city in which they desire to locate.

"The profession will be safeguarded very much in that the greatest temptation for a man to leave an ethical life and turn down to that of the advertiser, is in the early days of practice, when the financial rewards come in slowly and he gets to feel that all the older men in the profession are plotted against him, while if he only knew it they are really wishing that he succeed, and this plan will offer an opportunity for the old and young to meet on common ground, that of professional brotherhood."

How to get the recent graduate interested in the dental society and his affiliation with a society and ethical practitioners has been a much-talked-of problem and this plan promises to solve the question if it work out as expected. It is at least worthy of trial.

OHIO STATE DENTAL BOARD APPOINTMENT

Governor Cox on April 14, reappointed Dr. H. C. Matlack, of Cincinnati, a member of the Ohio State Dental Board. The profession will be glad to know that one who has served the board and profession so well will serve another term.

No governor has heretofore recognized the dental profession as has Governor Cox. He asked the dentists to meet with physicians and others for a conference with the State Board of Health, to devise ways and means for better health conditions among residents of Ohio. He shortly after this appointed a dentist on the State Board of Health— the first appointment of the kind recorded in any state in the Union. He appointed dentist delegates to represent the state at the Fourth International School Hygiene Congress at Buffalo last summer. He also sent his secretary to represent him at the recent meeting of the Ohio State Dental Society at Toledo. He has been an ardent advocate of the oral hygiene movement, realizing what it means to the health and efficiency of the people. And now he has appointed a member of the State Dental Board from a list of names submitted to him by the Ohio State Dental Society.

The members of the dental profession of Ohio will appreciate the interest Governor Cox has shown in dental matters and approve what he is doing in this way for the best interests of the people throughout the state.

NEW PUBLICATIONS

Dental Electro-therapeutics. By Ernest Sturridge, L.D.S., England., D.D.S., Fellow of the Royal Society of Medicine, member of the British Dental Association, London, Eng. 12mo, 318 pages, with 154 engravings. Cloth, $2.75, *net.* Lea & Febiger, 1914, Philadelphia and New York.

This is probably the first book to make its appearance on what may be termed a new department of dental medicine. The development of the various sciences contributory to dentistry has brought into prominence the many practical applications of the electric current and its efficacy as a dental therapeutic agent. The author has made a special study of this new field, and has presented in a concise volume all that the practitioner of dentistry need know for the successful employment of these measures. He calls attention to the necessity of studying electro-physics—so far as it pertains to electro-medicine—and also the physiological and therapeutic effects, in order to carry out electrical treatment successfully. The book is especially intended to bring forward the value of ionic medication in the treatment of periodontal disease; and everything pertaining to ions and their use in dental treatment has been carefully detailed. It is only necessary fully to understand the efficacy of these methods to appreciate the value of ionic medication to the dental profession in these days when the medical profession looks first to the dentist to deal with oral sepsis, to which is attributed alimentary toxemia with its many serious consequences. The arrangement of the book is excellent. The first part, on electro-physics, gives, in seven chapters, a discussion of the various forms of current and the necessary apparatus; and the second part, on electro-therapeutics, describes the physiological and therapeutic effects, the technic, and the use of electricity for special conditions and purposes. The illustrations are numerous and excellent throughout.

Pathology, General and Special. A Manual for Students and Practitioners. By John Stenhouse, M.A., B.Sc. (Edin.) M.B. (Tor.), formerly Demonstrator of Pathology, University of Toronto, Toronto, Canada. Second edition, revised and enlarged, including selected list of State Board Examination Questions. 12mo, 278 pages, illustrated. Cloth, $1.00, *net.* Lea & Febiger, publishers, 1913, Philadelphia and New York.

To be able to grasp intelligently the new advances as they come and make practical application of them, the student and practitioner should have the fundamentals of the subject clearly in mind. To this end this Epitome is admirably suited; it is not a means of escape from wider or deeper reading, but an incentive and trustworthy guide to it. The text of the book is excellent, arrangement and illustrations good, and the questions at the end of each chapter will be found a strong mental stimulus, for they bring out in bold relief the important points throughout the volume.

Success in Dental Practice. By C. N. Johnson, M.A., L.D.S., D.D.S., Professor of Operative Dentistry in the Chicago College of Dental Surgery; Editor of the *Dental Review,* and Author of Principles and Practice of Filling Teeth, Text Book of Operative Dentistry, etc. Second edition. Philadelphia: J. B. Lippincott Co., publishers, 1913. Price, $1.25, *net.*

This little book of 160 pages is teeming with good suggestions, which, if followed, are sure to make a dentist more successful in his practice. The subject matter comprises: The Arrangement of an Office, Winning Patronage, Location, Extending

Acquaintance, Managing Patients, Records and Bookkeeping, Appointments and Sittings, Giving Credit, Collecting Accounts, Paying Bills, Fees, Employing an Assistant, Economy in Purchase and in Avoiding Waste, Bank Account and Investments, Professional Relationship and Citizenship.

W. B. Saunders Company, Publishers of Philadelphia and London, have just issued an entirely new eighty-eight page illustrated catalogue of their publications, describing some two hundred fifty books, including thirty new books and new editions. A postal sent to W. B. Saunders Company, Philadelphia, will bring you a copy.

Practical Oral Hygiene, Prophylaxis and Pyorrhea Alveolaris. By Robin Adair, B.S., M.D., D.D.S., Professor of Oral Prophylaxis and Pyorrhea Alveolaris, Southern Dental College, Atlanta, Ga.; Oral Surgeon, Grady Hospital (1910-1912); member Fulton County Medical Society, Georgia State Medical Society, Georgia State Dental Society, National Dental Society.
Atlanta, Ga., 1914. 400 pages, 100 illustrations. Price, $4.00.

The author states that this book is written for those dentists who desire practical information on the subjects of oral hygiene, prophylaxis and pyorrhea alveolaris. The first section is devoted to the great forward movement of oral hygiene. Here are given methods and forms for dental inspection of school children, and a collection of carefully-selected lectures furnishing the proper material for those called upon to deliver popular talks before school children, women's clubs, etc. This section also contains illustrations which may be shown and explained to a patient while in the dental chair. The second section contains practical information concerning the most efficient methods to conduct prophylaxis in a dental practice and names the materials to use in such work. The training of female assistants and the dental nurse question are treated in a most practical manner. The third section is a comprehensive description of pyorrhea alveolaris. Here is described in detail the methods of treatment now prominent before the dental profession. The business phrase of the question is also presented. The medical profession is now greatly interested in the question of *oral sepsis*, and to meet this advance the author devotes a chapter to their interests. The author says: "I have endeavored to familiarize myself with the methods of other specialists in this line of work, and, from time to time, have visited them in their offices in order to inspect their work and discuss with them the methods used. A number of these men have been quoted, and, in some instances, they have prepared descriptions of certain parts of their work for publication in this book." Throughout the text we notice a great deal of material that has been taken from pages of THE DENTAL SUMMARY and feel complimented that the author has drawn so freely from our journal. It is a thoroughly practical and excellent book and one from which every dental practitioner can derive great benefit. You can order it through your dental supply house.

"It's going to be war to the knife," declared the suburban man, who was feeding his chickens.

"What now?" asked his friend.

"Why, Blinks sent me a box of axle-grease and advised me to use it on my lawn-mower."

"Well?"

"Well, I sent it back and told him to use it on his daughter's voice" —Lippincott's.

OBITUARY

Dr. Mordecai Hiatt Fletcher

DR. M. H. FLETCHER, of Cincinnati, Ohio, died of cerebral hemorrhage, March 26, 1914. He was born in Richmond, Ind., September 18, 1849. His early life was spent in or near Richmond. He attended the country district school in the winter up to the age of 14 years. He was then apprenticed to a jeweler in Richmond for four years and later bought out said jeweler. About this time he attended Earlham College, Richmond, Ind. From 1870-79 he lived in New York, St. Louis and Richmond.

He began the study of dentistry under Dr. J. W. Jay, of Richmond, Ind., in 1877. In the autumn of 1879 he entered the Ohio Dental College, Cincinnati, Ohio, graduating from this college in the spring of 1880.

He made a trip to Europe in the summer of 1882.

He graduated from the Miami Medical College in 1884, having done all dental and medical college work while practicing dentistry.

His research work began with his medical work and has been largely in biology, including pathology. He has published no books, but has written and read many papers, mostly reports of original research work in physiology and pathology; these have nearly all been published in various dental and medical journals. He served for six years as a member of the Ohio State Board of Dental Examiners; anatomy, histology and pathology being his subjects.

In 1887, by request, he gave a paper before the Oral Surgery Section of the Ninth International Medical Congress held at Washington, D. C., subject: "New Growth of the Pulp Chambers of Teeth of Mammalias." This was the result of seven years' investigation.

In 1893 he was made chairman of the Oral Surgery Section of the Pan-American Medical Congress. For fifteen years he served in some capacity as committeeman or officer in the American Medical Association. He gave a paper before that section almost every year for the last twenty years. Among his papers was one showing the untenable position of the process of Implantation. A paper describing these experiments was written for the Tenth International Medical Congress held in Berlin, in 1890.

More recently his investigations have been along the lines of diseases of the human mouth and teeth and their connection with the accessory air cavities of the nose and face and their bearing upon the general health. In July, 1895, he finished a course and received an academic degree in Electrical Science and Electro-Therapeutics in the National School of Electricity.

For more than twenty-five years he was closely connected with the management of the Cincinnati Society of Natural History. Most of this time he was a member of its board of managers, serving five terms as president.

In 1891 he took a course in Embryology at Earlham College, and gave a course at the same time in Photo-Micrography.

In 1905 Earlham College bestowed on him an honorary degree, that of "Master of Science" in view of what he had done along the lines of scientific research. He took a course in bacteriology at Ann Arbor under Professors Vaughan and Novy.

He was an inventive genius, even at this time making a great many of his instruments. He designed a tooth-brush which is now on the market and has many good qualities. He spent a great deal of time at the United States Pipe and Steel Foundry at Addyston, near Cincinnati, attempting to perfect a core-bar in making large water and gas pipes.

Even at his age, sixty-four, he was considered one of the boys, in athletic activities, going with a younger crowd of twenty on summer outings, where baseball, swimming and other sports were indulged in. He was an expert swimmer and gave an exhibition of his ability in this line as late as the past summer.

On Thursday, March 26, 1914, about 10:30 o'clock, while attending to the needs of a patient, Dr. Fletcher suffered a *hemorrhage into the brain*, causing paralysis of the right face, arm and leg. He was conscious for nearly an hour and able to recognize his wife and daughter, also the physicians in attendance, Drs. F. B. Sampson, E. W. Mitchell and F. W. Langdon. In about an hour he lapsed into unconsciousness, from which he did not rally. His death occurred about 4:30 o'clock P. M. of the same day, March 26th. There was at no time any evidence of pain or distress of any kind. The end came quietly and without struggle.

He was loved by his colleagues, honored by the profession, and his loss will be mourned by all. *H. C. M.*

Dr. John W. Moffitt

Died, February 27, 1914, in Harrisburg, Pa., of old age, in his seventy-ninth year, John W. Moffitt, D.D.S.

Dr. John W. Moffitt, a well-known pioneer of modern dentistry, and one of Nature's guileless gentlemen, has crossed to the Great Beyond.

He was the son of the Rev. John J. Moffitt, D.D., and Charlotte Eppley Moffitt, and was born at Orwigsburg, Pa., on June 5, 1835. Before he had attained his second year his father removed to the (then considered) far west, and settled in Ohio. Early dentists often combined two callings, and the father practiced dentistry in addition to attending to his ministerial duties.

Dr. John W. Moffitt received the usual school education of the time; and afterwards attended Bethany College, Va.

He early evinced an aptitude and enthusiasm for dental art. After a period of pupilage with his father, and also with Dr. Samuel Hullein, of Wheeling, Va. (now West Virginia), and thus being instructed in the then highly guarded mysteries of dental art and practice, he opened an office at Cadiz, Ohio, in 1853. Fond remembrance oft carried him back to his first plate, a silver one, because the patient was so satisfied with it, and another which followed shortly after, because the patient counted out fifty, separate, shining, one-dollar gold pieces therefor.

In 1855, Dr. Moffitt went on a trip through part of South America and the western part of the United States, and remained quite some time in California. Returning home late in 1857, he married and settled down to practice in Harrisburg, Pa. Since then, until prevented by the state of his health a few years ago, he continued in active practice, except during his service as a Union soldier in the Civil War. When under fire at the battle of Antietam he received orders to report at Hagerstown, Md., as an assistant hospital surgeon, and served in that capacity until honorably discharged in 1864.

Dr. Moffitt was one of our earliest porcelain specialists. Over sixty years ago he carved and baked porcelain blocks and teeth for his own use and that of the profession out of materials dug up and compounded by himself. Afterwards he supervised the manufacture of teeth on a large scale for some of the early manufacturers, personally carving the models, and molding, casting and finishing the bronze molds, baking the teeth, and in fact doing everything necessary in tooth manufacture. He always was a strong advocate of high-fusing porcelain.

Despite his love for the ceramic art, being an ardent disciple of Isaac Walton, he would leave a continuous gum case to catch a trout.

Ceramics was one of his hobbies. In 1860 he was awarded a patent for non-sectional block work baked on platinum. This he later abandoned to the profession through the Odontographic Society of Philadelphia. Another patent covered a tooth for continuous gum work as now practiced. He also obtained a patent for a tooth for rubber and plastic plates. Quite recently he introduced a method of attaching teeth to the platinum plate without soldering in continuous gum work.

The first bayonet-shaped forceps were made by a Philadelphia firm from a pattern cut out in wood and submitted by him and many old forceps show his name imprinted thereon

Dental flasks, adjustable articulators, separators, amalgam alloys, cements, and many other products of his genius have been manufactured, but his modesty and retiring disposition kept him from claiming the honors, and oft-times emoluments, received by others therefrom. He was a veritable encyclopedia of means and methods in the preparation of dental necessities, and his fund of information was willingly shared with all.

Obturators and artificial vela were a most successful branch of his practice, and quite recently he made an ingenious and important improvement in the construction of the latter.

He did not often place his ideas in print, although a few articles, chiefly on porcelain subjects, appeared over his signature in dental journals.

He was one of the first delegates to the American Dental Association, and at its meeting at Nashville, Tenn., in 1870, represented the Pennsylvania State Dental Society. He was an officer and charter member of the Pennsylvania State Dental Society, the Lebanon Valley Dental Society, etc., and in fact outlived a number of societies in which he was once prominent. He was also a member of the masonic fraternity.

Dr. Moffitt had a leading part in obtaining from the Pennsylvania legislature the charter for the Philadelphia Dental College, in which he matriculated in 1864. He, however, did not present himself for examination for his degree until 1888, when he graduated. From the institution of this college he acted as demonstrator in prosthetics and porcelain, with some short intermissions, for over forty years, and hundreds of successful practitioners can look back gratefully to his instruction.

He was married in Harrisburg, Pa., on December 20, 1857, to Harriet R. Wenrick, but his entire family predeceased him. He is survived by a brother, R. H. Moffitt, D.D.S., now retired, and the latter's son, Dr. J. J. Moffitt, who is a member of the Pennsylvania State Dental Examining Board.

Interment was in Harrisburg Cemetery on March 2, 1914.

T. J. McL.

CORRESPONDENCE

Naval Dental Corps

To the Editor—For the general information of the dental profession and those who may desire to enter the Dental Corps of the United States Navy I desire to state that the Act of August 22d, 1912, (Naval Appropriation Bill making appropriations for the Navy for the ensuing year) contained a provision authorizing a Dental Corps for the Navy.

In addition to the dental corps to consist of thirty acting assistant or assistant dental surgeons, the age of whom, on appointment, must be between 24 and 32 years, provision was made for a limited number as acting assistant dental surgeons for temporary service.

After having passed the required examinations appointees serve a probationary period as Acting Assistant Dental Surgeons for three years, at the end of which time they are examined to determine their fitness for appointment as Assistant Dental Surgeon.

Upon successfully passing the examination for appointment as Assistant Dental Surgeon, the candidate receives a commission, being nominated by the President and confirmed in the Senate in the same manner as other commissioned officers of the Navy.

Officers of the Dental Corps have the rank of lieutenant (junior grade) and are entitled to all the military courtesies and considerations that go with that rank and are accorded offices of other branches of the service in a similar grade.

They wear the same uniform as other officers of the Navy, with a designating device distinctive of their corps.

Officers of the Dental Corps receive the pay and allowances of lieutenant (junior grade), namely, $2,000 annually, or $166.66 per month. At the end of each five years' active service an increase of 10 per cent. is given until at the end of twenty years the maximum increase of 40 per cent. is received, making $2,800 annually, or $233.33 per month, with a further increase of 10 per cent when serving at sea or on a foreign station. When on shore duty they are furnished with quarters either in kind, three rooms, or commutation at the rate of $36 per month. An allowance for fuel and light is also provided.

When traveling under orders mileage is allowed at the rate of 8 cents per mile. Leave of absence on full pay may be granted by the proper authority at the rate of one month per year. Absence from duty on account of sickness involves no loss of pay.

The tenure of office in the Dental Corps of the Navy, except in case of Acting Assistant Dental Surgeons appointed for temporary duty only, is for life, unless sooner terminated by removal, resignation, disability, or other casualty.

All officers of the Dental Corps (except temporary appointees) are retired from active service at the age of 64 years, and when so retired (or when retired from active service for disability or other casualty contracted in the line of duty before that age) receive an annual pay for life amounting to three-fourths of the highest pay of their grade at the time of retirement.

When any officer of the Navy, including dental officers, has been thirty years in the service, he may, upon his own application, in the discretion of the President, be retired from active service and placed on the retired list with an annual pay for life amounting to three-fourths of the highest pay of his grade at the time of retirement.

Immediately upon official notification of the death of any officer, including dental officers, from wounds or disease not the result of his own misconduct, there will be paid to the widow, children, or dependent relative of such officer, previously designated by him, an amount equal to six months' pay at the rate received by such officer at the date of his death, less $75, to defray the expenses of interment; but the residue, if any, of the amount so reserved will be paid subsequently to the widow or other designated beneficiary.

It is believed that the status, pay and allowance and other incidentals of the corps should make the service desirable and attractive to such dental practitioners as may think they would enjoy a naval life. Assignment to duty may be made to Navy Yards, Naval Training Stations, Hospital ships and aboard vessels of the fleet.

The physical examination for candidates to the Dental Corps is thorough, and he is required to certify, on oath, that he is free from all mental, physical, and constitutional defects.

A knowledge of the common school branches is required. Credit will be given for knowledge of languages and the sciences, which, however, is not essential.

For further information address the Surgeon General, U. S. N., Navy Department, Washington, D. C.

Emory A. Bryant,
A. A. Dental Surgeon, U. S. N.

Sow an act and reap a habit;
Sow a habit and reap a character;
Sow a character and reap a destiny.

SOCIETY·ANNOUNCEMENTS

Dental Instrument Exhibit at Panama-Pacific International Exposition Will be of Educational Value to the Public

By Waldemar H. F. N. De Bille

To the average man, woman or child the dentist is the personification of his Satanic Majesty, and represents a survival of the torturer of the days of the Inquisition. That this view of the old-time dentist was fully justified seems probable, and the general public is ignorant of the fact that today, with all the modern devices of science at its command, the dental profession is able to perform surgical and mechanical marvels without the patient being required to undergo any pain.

Every dentist realizes that it is a fact that the majority of persons will put off a trip to the dentist until the pain from a decayed tooth or exposed nerve is so great that of the two evils the surgeon's "torture" seems likely to prove the lesser. The natural result is that teeth which might have been saved are lost and pieces of porcelain must be substituted.

To offset this ignorance dental societies are attempting to educate the public by means of proper publicity. The ethical dentist is unable to carry on a campaign of education by individual advertising and must rely upon the group or association of which he is a part to bring the facts before the public. In a few notable instances this publicity has proved valuable, but in the majority of cities lack of co-operation has prevented the more modern dentists from accomplishing as much as should have been done.

It is doubtful if any one factor in the education of the public can compare with the comprehensive exhibits which will be made of dental appliances and methods at the Panama-Pacific International Exposition. Several million people from all parts of the world will visit this exposition and as it is a well-known psychological fact that one which is dreaded will attract the attention and interest, a large percentage of these visitors will make a careful inspection of the exhibits of dental instruments.

Without doubt there will be displayed every instrument now in use by the modern dentist and it is probable that these will be compared with the crude instruments of torture used by the dentists of even a decade ago.

A modern dental office will be shown, in which will be displayed every kind of apparatus intended to alleviate and prevent pain, and expert attendants will explain to the visiting public the reason why the modern twentieth-century dentist is enabled to operate without fear of causing even the slightest temporary twinge of pain in the patient.

The exhibit will serve the dual purpose of helping the dental profession and the manufacturer of dental supplies and of aiding the public. By education the people will soon learn to realize that the dread they have felt for dentists is inspired by non-existent cause—a true bugaboo—and the thousands of "mouths" will be saved that would, under present conditions of prevailing ignorance, be entiely lost.

As a result the clientele of the dentists will certainly be increased and every dentist will benefit. And when the dentists' business increases the manufacturers of dental supplies naturally prosper in proportion.

The exhibits at the Exposition should be elaborate and comprehensive. To ensure this, dentists' associations throughout the country should either co-operate to arrange for a combined exhibit, or the manufacturers of dental supplies should attend to the installation.

The exhibit is classified under the Department of Liberal Arts and will be displayed in the Palace of Liberal Arts, one of the handsomest buildings on the Exposition site.

Sixth International Dental Congress (London)
Section X—Dental Education

The subjects for report to be followed by discussion are:

(1) The Teaching of Bacteriology for Dental Students: Methods of Teaching; Extent of Teaching. Reporters, Mr. J. Howard Mummery and ————————.

(2) A Practical Synopsis of Medical and Surgical Teaching for Dental Students. Reporter, Dr. Godon.

(3) First Principles in Practical Teaching. Reporter, Dr. Gaddes.

(4) Methods of Teaching Orthodontics to Dental Students. Reporters, Dr. Guilford and Dr. Martinier.

The mornings of the 5th, 6th and 7th of August to be devoted to Reports, and the afternoons to Independent Papers.

The committee of the Section is desirous of obtaining names of gentlemen willing either to discuss the above subjects, or to read papers on "Dental Education."

F. Bocquet Bull, Guy's Hospital, London, S.E.
George Sheppard, 59 Merrion Square, Dublin,
Honorable Secretaries.

To the Dental Profession of America

Columbus, Ohio, April 7, 1914.

The committee appointed by the Ohio State Dental Society at the 1909 meeting, for the purpose of raising funds for an American Memorial to the late Dr. W. D. Miller, desire to make the following report:

Funds have been received from the following states: Alabama, $25.00; Arizona, $25.00; Arkansas, $50.00; California, $60.00; Colorado,

$82.00; Connecticut, $50.00; Georgia, $60.00; Illinois, $531.00; Iowa, $200.00; Indiana, $75.00; Kansas, $134.50; Kentucky, $105.00; Maine, $25.00; Massachusetts, $100.00; Michigan, $300.00; Minnesota, $100.00; Missouri, $100.00; Montana, $15.00; Nebraska, $100.00; New Hampshire, $25.00; New Mexico, $25.00; New York, $125.00; Ohio, $1,303.00; South Carolina, $25.00; North Dakota, $50.00; South Dakota, $15.00; Oklahoma, $31.00; Oregon, $50.00; Pennsylvania, $20.00; Tennessee, $50.00; Texas, $50.00; Utah, $14.00; Vermont, $20.00; Virginia, $50.00; West Virginia, $25.00; Washington, $50.00; Wisconsin, $25.00; Wyoming, $10.00; total, $4,300.50; interest on this fund to December 1, 1913, amounts to $382.94, making a total in the hands of the treasurer, Dr. Weston A. Price, of $4,683.44. Florida and Mississippi have each voted $50.00, but the amounts are not in the treasurer's hands at this date.

The memorial will consist of an eight-foot bronze statue of Dr. Miller mounted on a seven-foot granite pedestal and be placed in the lawn of the public library, the most appropriate site in the city of Columbus, the capitol of Dr. Miller's native state. Suitable tablets will be prepared and it is the desire of the committee to state on one that the monument is erected by funds from every state in the Union. If your state is not represented in the above list, we want your co-operation in placing it there.

It is hoped that sufficient funds ($5,500.00) will be in the treasury that steps can be taken at once toward the construction of this memorial, that it may be finished and ready for unveiling at the 1915 meeting, which will be the fiftieth anniversary of the Ohio State Dental Society. The valuable co-operation of the honorary committees in the several states is hereby acknowledged; they have made this memorial a reality.

Other professions have done honor to their distinguished dead, let us do the same for Dr. Miller, whose life was one of unselfish devotion to the scientific advancement of dentistry.

Yours very truly,
Edward C. Mills, *Chairman,*
J. R. Callahan,
S. D. Ruggles,
Committee.

Georgia State Dental Society

The Forty-seventh annual meeting of the Georgia State Dental Society will convene at the Ansley Hotel, Atlanta Ga., June 4th, 5th and 6th, 1914, beginning on Thursday, June 4th, at 10.00 A. M.

The Southern Branch of the National Dental Association will meet in connection with the Georgia State Society and excellent papers will be read and clinics given.

All ethical practitioners are extended a cordial invitation. Any further information cheerfully furnished by the secretary.

803-4 Candler Bldg., Atlanta, Ga. Dr. M. M. Forbes, *Sec'y.*

Pennsylvania State Dental Society

The forty-sixth annual meeting of the Pennsylvania State Dental Society will be held at the Bellevue-Stratford Hotel in Philadelphia on June 30th, July 1st and 2d, 1914.

LUTHER M. WEAVER, *Sec'y.*,
7103 Woodland Ave., Philadelphia.

Northern Indiana Dental Society

The next annual meeting of the Northern Indiana Dental Society will be held August 28 and 29 at Culver (Lake Maxinkuckee).

O. A. VAN KIRK, *Secretary*,
Kendallville, Ind.

Montana State Dental Society

The Montana State Dental Society will meet in Great Falls, Mont., June 8th, 9th and 10th. All ethical dentists are invited. For further particulars address J. W. ADAMS, *Secretary*.
Billings, Montana.

American Society of Orthodontists

The next annual meeting of the American Society of Orthodontists will convene in Toronto, Ontario, Canada, July 2, 3, and 4, 1914.

WM. ERNEST WALKER, *Secretary*,
Nos. 629-31 Maison Blanche, New Orleans, La.

West Virginia State Board of Dental Examiners

The next annual meeting of the West Virginia State Board of Dental Examiners, for the examination of applicants for a license to practice dentistry in the state of West Virginia, will be held in Fairmont, beginning Wednesday, June 10, 1914, at 9:00 A. M. All applications, together with the fees; twenty-five dollars ($25.00), must be in the hands of the secretary at least one week prior to the date of examination.

Address all communication to L. GEO. BEERBOWER, *Sec'y.*,
Beerbower-Zeller Bldg., Terra Alta, W. Va.

Illinois State Board of Dental Examiners

The semi-annual meeting of the Illinois State Board of Dental Examiners for the examination of applicants for a license to practice dentistry in the state of Illinois will be held at the Northwestern Dental School, 31 West Lake Street, Chicago, Ill., beginning Thursday, June 11, 1914, at 9 A. M. All applications, together with fees, twenty-six ($26.00) must be filed with the secretary at least five (5) days prior to date of examination.

Address all communications to O. H. SEIFERT, Secretary,
305-6-7-8 Ridgely Bank Bldg., Springfield, Ill.

National Association of Dental Examiners

The thirty-second annual session of the National Association of Dental Examiners will be held at the Rochester Hotel, Rochester, N. Y., beginning July 6, at 10 A. M. and continuing until adjournment.

Every state board holding membership in the association is earnestly requested to have at least one representative present at this session. Members of all state boards are invited.

Hotel reservations should be made immediately, as the National Dental Association meets in Rochester during the week beginning July 6 and the attendance undoubtedly will be large.

A. E. HONEY, *President*,
Kalamazoo, Mich.
T. A. BROADBENT, *Secretary*,
15 E. Washington St., Chicago, Ill.

Wisconsin State Board of Dental Examiners

The Wisconsin State Board of Dental Examiners will convene in Milwaukee at Marquette University on June 22d, 1914, at 2 o'clock P. M. for examination of applicants to practice in Wisconsin.

High school diploma, application and $25.00 fee to be filed with the Secretary fifteen days prior to above date.

Dental diploma to be presented in advance of the examination.

Junior dental students presenting a clear card for two years' unconditional work from a reputable dental college and filing a high school diploma, or its full equivalent, will be permitted to participate in the theory examination in the following six major subjects: Anatomy, physiology, histology, chemistry, bacteriology, materia medica. The grades made in these subjects will be credited at subsequent examinations.

Special application blanks for this examination and $10.00 fee, together with high school credits to be filed fifteen days in advance.

F. A. TATE, *President*,
W. T. HARDY, *Sec'y.*,
1404 Majestic Bldg., Milwaukee, Wis.

South Carolina State Board

The next annual meeting of the South Carolina State Board of Dental Examiners will be held at Chick Springs, South Carolina, beginning Friday, June 12th, at 10 o'clock A. M.

Examinations are theoretical and practical on regular college branches. Applicants must furnish instruments and material for any demonstrations called for by the board. Applicants must exhibit diploma from reputable dental college before being registered for examination. For further information address

R. L. SPENCER, *Sec'y.*,
Bennettsville, S. C.

Pennsylvania State Board of Dental Examiners

The next regular examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday and Saturday, June 10, 11, 12 and 13, 1914. Application blanks can be secured from the Department of Public Instruction, Harrisburg. For further information address the secretary,

ALEXANDER H. REYNOLDS,
4630 Chester Ave., Philadelphia.

Arkansas State Board of Dental Examiners

The next meeting of the Arkansas State Board of Dental Examiners will be held at the Marion Hotel in Little Rock, Arkansas, on June 8th and 9th.

Application and fees should be filed at least ten days prior to date set for examination.

For future particulars address

I. M. STERNBERG, D.D.S., *Secretary,*
Merchants Nat'l. Bank Bldg., Fort Smith, Ark.

South Dakota Board of Dental Examiners

The next regular semi-annual meeting of the South Dakota Board of Dental Examiners will be held at Sioux Falls, South Dakota, on Tuesday, July 7th, 1914, at 1:30 P. M. Applications for examination must be made before July 1st. For blanks and further particulars apply to

ARIS L. REVELL, *Secretary,*
Lead, South Dakota.

North Carolina State Board of Dental Examiners

The next regular meeting of the North Carolina State Board of Dental Examiners will be held at Hendersonville, N. C., beginning promptly at 9:00 A. M. on Monday, June 22, 1914. All applications must be in the hands of the secretary not later than June 15th.

For further information and application blanks address the secretary.

DR. F. L. HUNT, *Sec'y,*
Asheville, N. C.

New Jersey State Board of Dental Examiners

The New Jersey State Board of Dental Examiners will hold their regular meeting and examination in the Assembly Chamber of the State House, Trenton, N. J., on June 29th, 30th, and July 1st, 1914. Applications must be filed *complete* at least ten days prior to date set for examination. No interchange of license. License fee, $25.00.

For further particulars, apply to Alphonso Irwin, D. D. S., Secretary, 425 Cooper Street, Camden, N. J.

Michigan State Board

The next meeting of the Michigan State Board of Dental Examiners will be held at the Dental College, Ann Arbor, commencing Monday, June 15th, and continuing through the 20th. For application blank and full particulars address

F. E. Sharp, *Sec'y,*
Port Huron, Michigan.

Ohio State Dental Board

The Ohio State Dental Board will convene in Columbus on June 16th, 1914, for examination of applicants to practice in Ohio.

Applications must be in the hands of the secretary June 6th.

H. C. Matlack, *President,*
19 W. Seventh St., Cincinnati,
Holston Bartilson, *Secretary,*
150 E. Broad St., Columbus.

Susquehanna Dental Association

This is a renewal of your invitation to attend the fifty-first annual meeting of the Susquehanna Dental Association to be held at Delaware Water Gap, Pa., May 26, 27 and 28, 1914.

"The original noise is what counts—most people are merely echoes." We are the original noise and we are going to prove it to you—without apologies.

We are, as usual, fortunate in having with us, men who have ideas and ability to express them; men who have imagination to foresee something better than we now possess, and who, unselfishly, pass these good things on—gratis. These happen to be the things you are looking for, something to uplift and benefit; something to break up your mental ankylosis and replace your grouch with a grin. We have them in abundance.

In this rejuvenating, soul-reposing bit of country, where there is ozone, sunshine and good-cheer a-plenty, you will be singing with the poet:

"The year's at the spring,
And day's at the morn,
Morning's at seven;
The hillside's dew-pearled;
The lark's on the wing;
The snail's on the thorn;
God's in His Heaven—
All's right with the world."

Don't forget to bring the family. If you find it impossible to come, we shall be very sorry—for you.

You will hear from us again

Yours very truly,
Publicity Committee,
Walter Richards, *Chairman.*

National Dental Protective Association

The annual meeting of the National Dental Protective Association will be held in Washington, D. C., May 19th. 1914, at the Dental Department of George Washington University at 7:30 P. M. for the election of trustees and transaction of business.

E. P. DAMERON, *President,*
M. F. FINLEY, *Secretary.*

Northern Ohio Dental Association

The fifty-seventh annual session of the Northern Ohio Dental Association will be held at the Wigmore Coliseum. Cleveland. Ohio, Thursday. Friday and Saturday, June 4, 5 and 6.

C. D. PECK, *Secretary.*

Iowa State Dental

The fifty-second annual meeting of the Iowa State Dental Society will convene at Des Moines, Iowa, May 5, 6 and 7, 1914, beginning Tuesday, May 5th, at 9:00 A. M. Elaborate clinics and lectures and a large exhibit will be presented.

Further information will be furnished upon request from ethical practitioners of other states contemplating a visit to the meeting and to whom we extend a cordial invitation.

Exhibitors desiring space should apply to Dr. W. J. Cameron, Des Moines, Iowa.

C. M. KENNEDY, *Sec'y,*
Des Moines, Iowa.

New Jersey State Dental Society

The forty-fourth annual convention of the New Jersey State Dental Society will be held at the North End Hotel, Ocean Grove, N. J., July 15th, 16th, 17th and 18th, 1914.

An attractive meeting is being arranged and a cordial invitation to attend is extended to all ethical dentists.

JOHN C. FORSYTH, *Sec'y.*

The Tennessee State

Fourth annual meeting. Chattanooga, Tenn., June 25-26-27, 1914. Fine program, ample accommodations. Every ethical dentist welcome.

C. OSBORN RHEA, *Secretary,*
Chattanooga, Tenn.

Section of Stomatology—American Medical Association

The annual meeting of the American Medical Association will be held at Atlantic City, June 22 to 26, 1914.

Program for the Section of Stomatology:

TUESDAY, 2 P. M.

1. Chairman's Address.........................Dr. William C. Fisher, New York
2. Mesothelial Tumors of the Jaw................Dr. Robert H. Ivy, Philadelphia
   Discusser—Dr. Robert P. Bay, Baltimore
3. Cystic Tumors of the Jaw....................Dr. Gorden New, Rochester, Minn.
4. Differential Diagnosis of Major Mouth Lesions. Dr. Stewart L. McCurdy, Pittsburg
5. The Methods of Obtaining Dental Service in Hospitals by the Appointment of Internes..............................Dr. Herbert L. Wheeler, New York

WEDNESDAY, 2 P. M.

6. What Shall be the Content for a Course in Oral Surgery in Our Dental Schools ....Dr. A. H. Levings, Milwaukee, Wis
   Discussers—Dr. George V. I. Brown, Milwaukee; Dr. Thomas Gilmer, Chicago; Dr. F. B. Moorehead, Chicago; Dr. M. J. Schamberg, New York City; Dr. J. A. Pettit, Portland, Ore.; Dr. Vilray P. Blair, St. Louis; Dr. M. H. Cryer, Philadelphia; Dr. James G. Sharpe, San Francisco.

THURSDAY, 9:30 A. M.

7. The Scientific Routine of Tooth Brushing and Mouth Cleaning..... ....Dr. Joseph Head, Philadelphia
8. Osteoplastic Surgery of the Face..........Dr. Wayne W. Babcock, Philadelphia
9. Fractures of the Inferior Maxilla.........Dr. Henry S. Dunning, New York City
10. Bacteriology of Alveolar Abscess.................Dr. Thomas Gilmer, Chicago
11. Acute Parenchymatous Glossitis.....................Dr. Virgil Loeb, St. Louis
12. The Section of Stomatology as a Factor in the Evolution of Dental and Medical Science.............................Dr. Geo. V. I. Brown, Milwaukee, Wis.

THURSDAY, 2 P. M.

13. Mouth Infection as a Source of Systemic Disease....Dr. Frank Billings, Chicago
    Discussers—Dr. Edward C. Rosenow, Chicago; Dr. Charles H. Mayo, Rochester, Minn.; Dr. Victor C. Vaughan, Ann Arbor, Mich.; Dr Charles L. Mix, Chicago; Dr. Daniel H. Squire, Buffalo.

(The Peridental Membrane as a Source of Infection)............ ....
(Mouth Infection in Relation to Nervous Affection)...Dr. C. B. Craig, New York City

We are exceptionally fortunate in having on the program of this meeting the gentleman whose original work has correlated certain Systemic Diseases with Mouth Infections.

An effort will be made to harmonize the different methods of teaching Oral Surgery in our dental schools, and to formulate a comprehensive scheme for a uniform course of instruction.

A very attractive program is here offered and those who are interested are cordially invited to be present and take part in the discussions.

Eugene S. Talbot, *Secretary.*

The Michigan Meeting

The meeting of the Michigan State Society held in Detroit, April 9, 10, 11, was a most gratifying success. Full report of the meeting will appear in future issues of The Dental Summary, official magazine of the society.

Resolutions pledging the members in support of the oral hygiene campaign to be waged throughout the state were adopted. Action was also taken to affiliate the state

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The acid reaction of Listerine has no effect whatever upon the tooth structure, whilst its alterative properties not only add to the protective quality of the saliva, but are antagonistic to the bacteria of the mouth.

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"THE DENTIST'S PATIENT"

A leaflet designed to convey useful information respecting the care of the teeth.

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organization with the national association. Recommendation of this, as well as of the appointment by the legislature of state lecturers to carry on a work similar to that in New York, was contained in the address of Dr. William A. Giffen, the retiring head of the society.

One of the spectacular features of the session was a moving picture demonstration of dental work by Dr. Giffen. The exhibition, which is unique, resulted in a remarkable discussion, after which it was declared that an effort would be made to have the moving picture method of instruction introduced in the colleges. Dr. Giffen, who paid the expenses of the exhibition out of his own pocket, was given a rising vote of thanks.

Dr. F. Leland, of Detroit, gave a lecture showing the way the school children in Detroit are taught mouth hygiene A large number of children and teachers were used in a demonstration. One of the other lecturers from Detroit was Dr. C. H. Oakman.

The committee which reported on the movement to extend the clinic work in the city and state consisted of Dr. C. J. Lyons, of Jackson, chairman; Dr. C. J. Bates, of Durand, and Dr. Irving D. Carpenter.

The work being done in Detroit to preserve the teeth of school children should be carried on throughout the rural communities, said Governor Ferris, in his address before the society, in the Board of Commerce building.

It is illogical to train a teacher to proficiency in nine or ten subjects of the curriculum and then to leave the teacher ignorant of the fundamental laws of health, the governor added, and said that the next legislature would be urged, if he happened to be governor, to appropriate money to carry on hygienic work, such as care of teeth, in the rural communities.

The following officers were elected: Charles A. Burbridge, Grand Rapids, president; John C. Bowles, Detroit, vice-president; F. Ward Howlett, Jackson, secretary; E. J. Chamberlain, Grand Rapids, treasurer; A. C. Thompson, Port Huron, and George F. Burke, Detroit, members of the council.

The next meeting probably will be held at Battle Creek.

One significant feature of the meeting was the attitude of the public press, which was fair, favorable, dignified and entirely without the slightest flavor of cheap wit, which often has characterized reports of similar meetings in the past. As an evidence of this change for the better, we print the following editorial from The Detroit Times of April 14:

WHAT'S GOOD FOR HORSE RACING IS GOOD FOR MAN RACING

We cannot recall the name of the man, but the past few days we have had in mind a jolly old veterinary-surgeon who must have been known all over Michigan, or at any rate in every town where there was a half-mile track.

Once seen on a track with a little roan mare he drove, he would never be forgotten, for the exhibitions he gave with his diminutive bit of horse flesh were both startling and amusing.

In size the old veterinary looked in the sulky to be bigger than the mare and it occurred to many that HE ought to be doing the pulling, but despite the handicap the mare would trot or pace, we forget which it was, away from any field of half-milers she found herself in.

And while she flew down the back course, the veterinary would sit carelessly in the sulky contentedly puffing at his cigar, as if out for a Sunday afternoon drive with all the time in the world on his hands.

Coming into the home stretch, the lines in his hands limp, any friend along the course would be duly recognized and the veterinary would doff his hat if the acquaintance happened to be one of the fair sex.

The fact that the little mare was the best horse on the half-mile tracks, and the comedy injected into a serious matter such as horse racing, were the methods used by the veterinary to advertise his business, but the exhibitions were none the less wonderful.

"It's because I keep her teeth right," he always explained when accounting for the great performances of the little mare.

"She never makes a break; have you noticed that, gentlemen?" he would ask the crowd he was addressing.

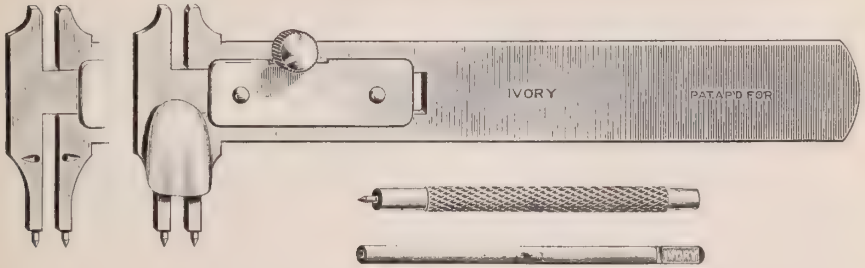
"It's because her teeth are right; it is because she can chew her food properly, making digestion easy for the other organs, thereby keeping the muscles of the body in the best and hardest condition; keeping her blood pure and flowing properly and the heart working properly, her head clear and her nerves in the finest shape."

On the advantage to horse racing of good teeth in a horse's mouth the old veterinary would go on talking for hours at a time.

The old veterinary and the remarkable roan he drove came to mind last week while the State Dental Society was holding its meeting here, and discussing so fully and so earnestly the vital matter of mouth hygiene.

MASON'S
Spacing Caliper and Auxiliaries

Patent Applied For



THIS Spacing Caliper provides an easy method for adapting backings to facings so that it is impossible for the flux or the solder to come in contact with the porcelain, thus eliminating checking.

Operation

The pins of the facing are placed in the holes on the side of the Caliper which have guide slots to guide the pins into the holes; this accurately spaces the holes which register with pins of the tooth, held in that position by the thumb nut; the backing is then marked or pierced by the hardened points which give the exact spacing for the pins; now place the backing thus marked on a piece of lead; then with the pointed punch the metal or gold is pierced, throwing up a lip; giving an aperture the same size of the pin; the backing thus pierced is placed on the tooth, the lips extending on the pins, finally to burnish this lip of gold to the pins, the engine or lathe tool is used, which has an aperture in the end of the same, which fits over the pins, then with a high speed of the engine or lathe the gold is burnished around the pins, which after examination will show that the gold is spun up around the pins, as though attached to them; furthermore the biting or other edges of the teeth may have the backing burnished over them without displacing the metal from the pins; this is economical as that part of the pin extending instead of being bent over "as usually done" may be clipped off.

Price Complete - - - -	**$2.50**
Burnisher or Punch, separate each	**.25**

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21 North 13th Street, Philadelphia, Pa.

It having been so clearly demonstrated that the owner of the fleet little mare was right, by the well-known fact that all the leading stables visiting the Grand Circuit carry veterinary surgeons with them the year around, what better example do we need of the importance of good teeth to HUMANS?

What is true of one body is true of another, be it the body of brute or human, because it is true that what is bad for one body is bad for another.

The matter of good teeth should be given the important consideration by the state, as the dentists recommended it should be while in Detroit.

The people should be educated in the matter of mouth hygiene and by the state, as the dentists recommended they should be.

The importance of good teeth, and the preservation of good teeth, to the public health and to strong and rugged bodies and clear and quick minds is a thing that the people cannot be reminded of too often.

And the reminder should come from the state, through its health department, by personal representation, so that it may be the most impressive, and thereby bring about the greatest benefit.

The growing-up citizen we are simply grooming for the great race of life.

We are educating him and fitting his mind, and giving one coming citizen an equal start with the other, but we are not looking after EVERY coming citizen as we should in the matter of fitting him for endurance.

Which means that we are not fixing his teeth and are not taking the proper steps to protect his body and to safeguard his health.

We are doing this here and there, and it is fine that we are, but we are not doing it GENERALLY, all over the state, as we should be doing.

The next legislature should heed this warning sounded by the dentists and should be found approved of the great work of conservation that is suggested.

Resolution on the Death of Dr. M. H. Fletcher

When the Cincinnati Dental Society extends to the family of Dr. M. H. Fletcher its sympathy in their bereavement, it does so with a deep sense of its own loss at the passing away of one of its most beloved and inspiring members. The consolation in which the society takes refuge and which it begs the family of Dr. Fletcher to share, is the consciousness that his life was of unusual happiness, his professional career honorable and successful in the highest degree.

It was a privilege to have known so perfect a gentleman. The influence of his rare mind and character was widely felt. By its passing, not only the profession, to which Dr. Fletcher contributed so much distinction, but the community at large has suffered a great loss.

The inspiration of his lofty ideals, the helpfulness of contact with such a master of the profession, the joy of companionship with a nature so genial, will be sorely missed by this society. But his memory will live long in the hearts of his brothers and will always be synonymous with the highest standards of the excellence in conduct and in professional skill.

April 6, 1914.

C. Stanley Smith,
J. R. Callahan,
Sidney J. Rauh,
Committee.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXIV JUNE, 1914 No. 6

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The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

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L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

ACCURATE REPRODUCTION OF THE TOOTH CAVITY BY THE IMPRESSION METHOD*

BY DR. F. T. VAN WOERT, BROOKLYN, N. Y.

FROM OBSERVATIONS of the past thirty-five years, I am lead to believe, that unless some reliable and practical method for the production of the cemented filling is secured, it will suffer the fate of many other valuable discoveries and become a thing of the past.

It is but a short time, a few years ago, that porcelain occupied a position upon the pinnacle of fame and was used the world over, but its decline set in and today there is so little of it used that it hardly pays the manufacturers to market the proper material for its production.

Then came the gold inlay, in its various forms, which was received by comparatively few, with enthusiasm, perhaps because of Dr. Taggart's great discovery before it had time to impress its value upon the profession. It did seem at that time that we had been groping in the dark and Dr. Taggart's presentation was like the dawn of a glorious sun-light and everlasting day. But, sad to say, it has reached its zenith and is now on the decline and unless some means of securing more universally successful results are obtained, it will become but a faint glimmer in the dark as a substitute for lost tooth structure. This is a prediction that I have heard voiced in open meeting recently; and the number of individuals who have stated that they were doing little or no cast gold work is astounding and I believe this to be because of an effort to follow a few exceptionally skillful operators in the so-called direct method. Porcelain and cast-gold fillings are far too valuable to the public and the profession to suffer such

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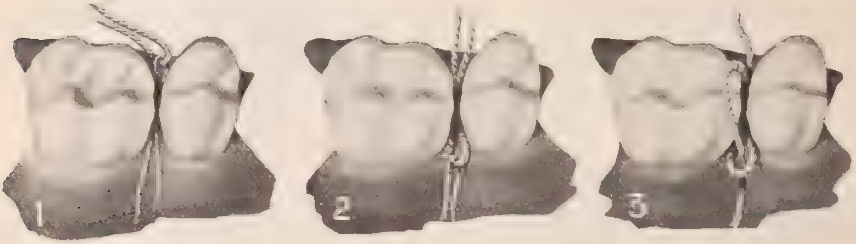
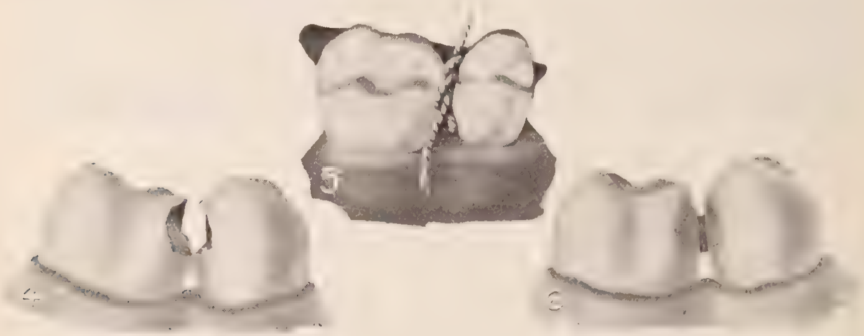
*A lecture delivered at the Ohio State Dental Society, December, 1913.



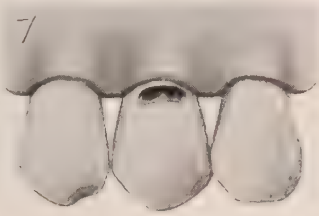
The first slide shows the method of placing the separating cord in position between the teeth. It is threaded through with a piece of waxed floss silk acting as a leader.

Slide No. 2 is a description of the first portion of the loop, and slide 3 shows the completed operation. This method is indicated in all cases where the destruction of tissue on the approximal surfaces has not progressed beyond the contact or point of knuckle. In those cases where the loss of tissue has been so extensive that the teeth have assumed an abnormal position and are leaning toward each other, as shown in slide No. 4. it is necessary for some extensive movement, to accomplish which I have found the preparation known as Sea Tangle Tent (first suggested by Dr. Johnson, of Brooklyn) by far the most satisfactory for the purpose and is applied as shown in the next slide, No. 5.



First remove the superficial decay and fill the entire place with Calxine cement and insert a smaller piece of the Sea Tangle and trim the cement to free both teeth as shown in this slide, No. 6. The Sea Tangle expands in its diameter and not in its length. This should be kept in mind in cutting and placing. It will move the teeth rapidly and with very little, if any, soreness.

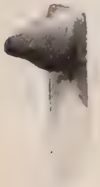
a fate. We have but to consider the results of a number of scientific investigations to that end as a proof of the above. Take, for instance, the efforts of your worthy president, Dr. Price, and Dr. Nies, and a number of others whose deductions as presented to the profession in writings and clinical demonstrations prove conclusively their recognition of the unreliability of the so-called direct method.

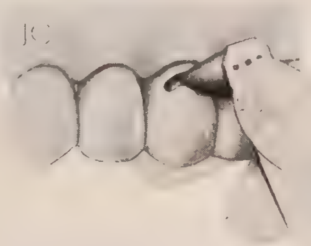


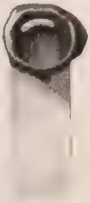
The next slide, No. 7, shows a simple cavity on the labio-cervical ridge, and No. 8 is the tray for attaching the compound to.

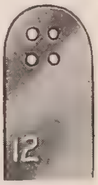
This matter is of vital importance. There is probably no boon offered to suffering humanity within the province of dental science which means so much, and it is our duty and obligation to see that it is made available for all. Hence my earnest efforts in a small way to help in the perfection of this marvelous method for the preservation of human teeth.

In the direct method, a cavity is prepared as for the indirect. Namely, the margins as nearly at right angles to the pulpal wall as possible, to permit of a suitable draught, and so designed as to form a mechanical lock for the filling. Inlay wax is next softened to the proper consistency to permit of forcing it if possible, into every crevice of the cavity, and over its margins. The patient is then directed to bite upon it as in the act of mastication. It is then chilled and all surplus removed with properly shaped carving instruments. The occlusal surface is next carved to the proper contour designing the sulci between the occlusal planes,







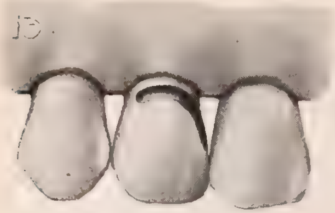


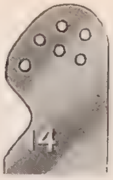
No. 9 shows the tray and compound ready for taking the impression.

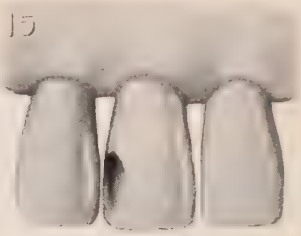
No. 10, the method of application.

No. 11, the result. Should such a cavity be located at the cervical line, the tray is formed as shown in No. 12, which shape is in conformation of the festoon of the gum of the gingiva and the contour of the tooth at the point.

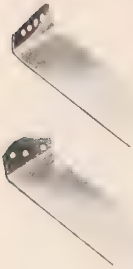
which was produced by the opposing teeth. The wax filling is next polished and is then ready for removal and investment. It is here that our troubles begin and in proportion to the complications of the cavity formation; be it the simplest of approximal and occlusal cavity, the wax must be released from its seat and withdrawn in direct line of the draught of the cavity or distortion will result. How is this to be accomplished? Is it by so-called teasing with one or more sharp-pointed instruments? If so, how many are able to accomplish it without marring—such as cutting or chipping of the margins; or is it to be removed by the insertion of a warm instrument or sprue wire? If so, where upon the occlusal surface can this connection be made without injury to or complete obliteration of one or more of the occlusal planes? In either event some redressing has to be resorted to which immediately eliminates its claim of a direct filling. It must be remembered, however, that there is not a wax available which will not either chip at the margins, crack or break at the weakest point through the body, or warp. And I doubt if one is possible possessing the essential quality for burning out of the mold. But this is the least of our troubles. The vital part of the filling is at the cervix, particularly when the cervix is at the gingiva. A very large percentage of cast

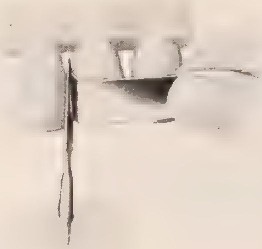


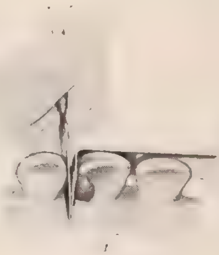




No. 13 represents cavity involving the labial and mesio-approximal surfaces.
No. 14, tray for the same.
No. 15 is the mesio-approximal in a superior central.

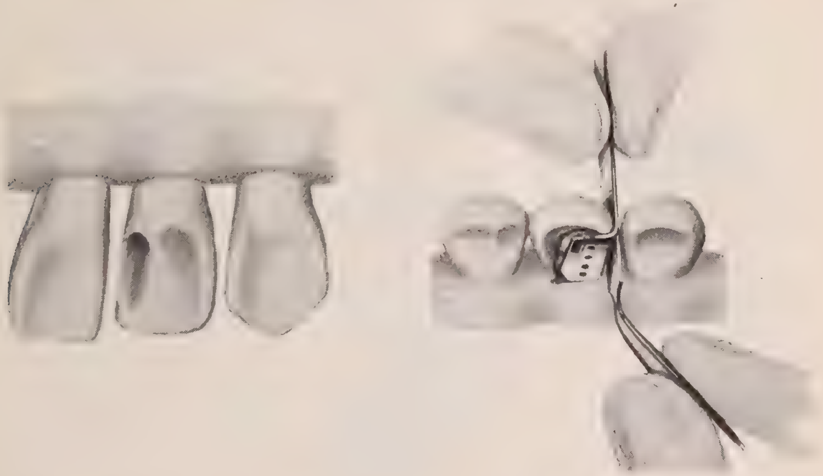




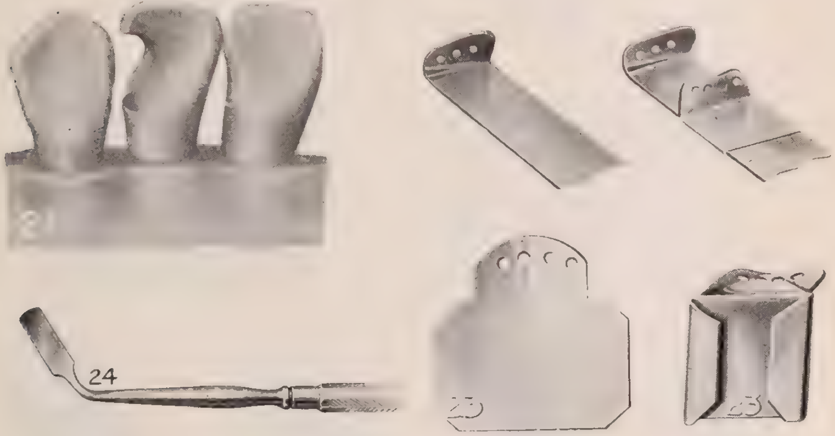


No. 16 is the trays for both the mesial and distal and their application as shown in Nos. 17 and 18, for the mesio cavity.

fillings fail at this point, for the following reason: The gum tissue occupying the interproximal space is of a very much higher resistance than the wax, yet not enough to prevent its displacement by the wax when first inserted under pressure. But immediately upon the release of pressure, this tissue, in its effort to assume its normal or original position, pushes the wax up and drags it away from the cervix. Therefore, if the direct method is to be used either a tray or matrix should be employed to hold the gum tissue under subjection. From this it is plain that a success-



No. 19 is the distal cavity and No. 20 the method of application.



The next slide, No. 21, represents a cavity involving the mesial, approximal and distal surfaces and is probably one of the most difficult to secure a matrix from but not at all difficult to obtain an accurate impression of.

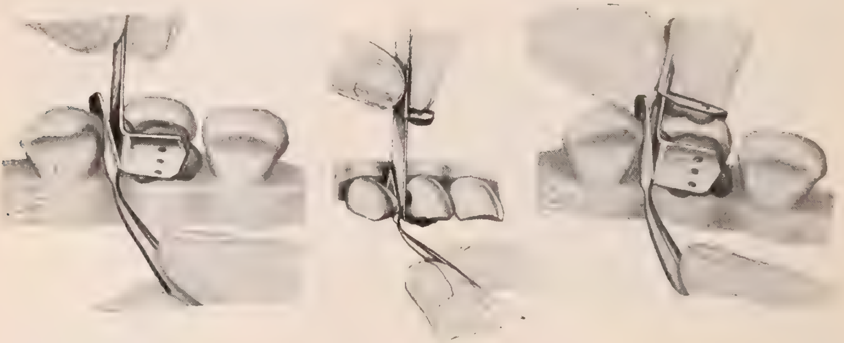
Slide No. 22 shows a two-piece tray, the second section sliding upon the first.

No. 23 shows the method of constructing this second section.

No. 24, the form of spatula necessary for the operation.

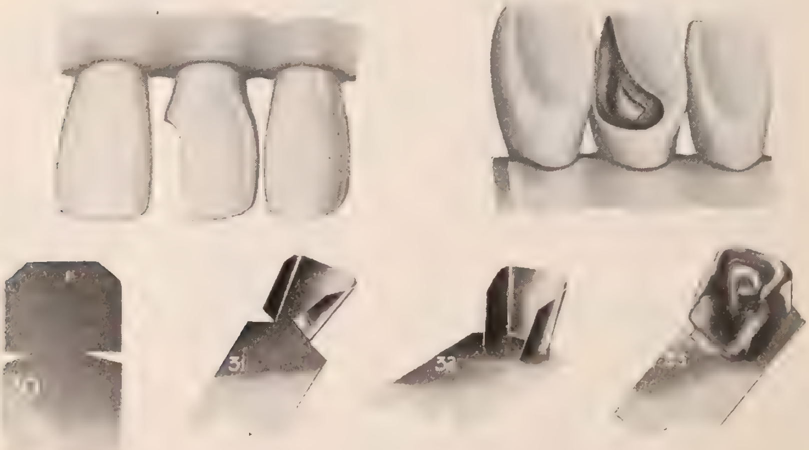
ful operation by the direct method means an exceedingly delicate dexterity of skill, that is not possible at all times even with the best of operators.

You will observe that I am devoting the most of my time to the treatment of gold and not including porcelain, because the majority of the strongest advocates of the direct method for the former concede the superiority of the indirect method for the latter, just why, I fail to understand. If an accurate reproduction of the tooth cavity can be made in one case, why not in the other?



No. 25 depicts the first step in taking this impression.
No. 26, the second, and No. 27, the final.

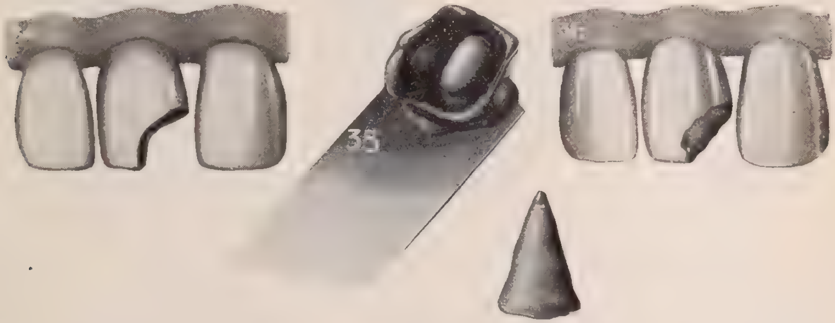
The possibilities of the indirect method when properly employed seem so apparent that it is almost a mystery to me why it is not more generally adopted. I have had the pleasure of converting some very prominent members of our profession to this method and in no instance have I known of their recanting, but do everything in their power to convert others. A careful analysis of the subject easily proves, first, that



Nos. 28 and 29 show a cavity for contour restoration of a superior central.
Nos. 30, 31 and 32 show the method of forming a tray for this operation.
No. 33, the result.

just as accurate an impression is possible, if not more accurate, with a suitable impression material, confined in a properly prepared tray or cup as with any inlay wax known to the present writing.

The next step is the production of a die from the impression, which with the modern alloy, cements, etc., it seems almost incredible that anyone should question the accuracy of reproduction. Beyond this point I don't believe anyone is blind to the many advantages such as ease, perfection of finish in the wax, minimizing the dangers of injury in polishing the casting, and this operation being greatly facilitated by placing the casting in the die, thus protecting all the margins, also the opportunity to attach a sprue at the greatest bulk of the filling and distant from all margins and occlusal surfaces, and most important of all, the ease with which the wax filling may be removed from the die without injury. This in reality is the most difficult problem in the whole situation and I cannot pass without expressing my appreciation of the wonderful achievements of Dr. Weston A. Price, of Cleveland, and Dr. F. H. Nies, of Brooklyn, in this direction. I am of the opinion that their efforts come nearer a direct method than any of the others, as the wax filling in this instance is not disturbed after placing it in position until it is burnt out in the investment and the gold is cast directly into the die.



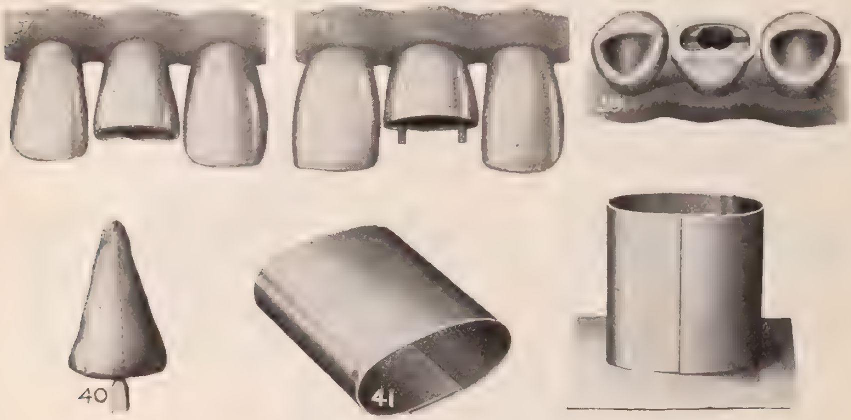
No. 34 shows a very deep cavity in which the impression is best secured by introducing the compound in two sections; the first is a cone as seen in Figure 35, which is forced into the cavity and over the margins, as shown in Figure 36. The balance of the impression is then taken with a tray like No. 32.

The accurate reproduction of the tooth cavity is not as simple a matter as it may appear, nor is it a difficult procedure, when all of the principles of the proper technic are carefully considered.

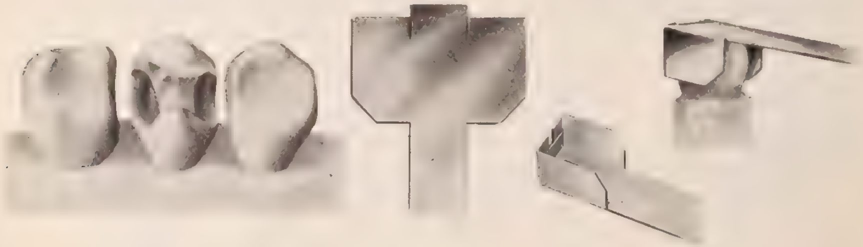
There seems to be a prevailing opinion that the shaping of a suitable portion of wax, modeling compound or other like material, then warming it to a consistency that permits of a sharp imprint, forcing it into the cavity by any means regardless of the cavity formation, chilling and removal, is all that can be expected of the indirect method; the proof of which is easily established by an inspection of the various devices marketed as being universal and suitable to all cases. This has been a very large factor in depreciating the truly great value of the impression method.

To show this is erroneous and a mere makeshift for what is in reality a wonderfully accurate and scientific operation when properly performed, is the purpose of this paper.

The requirements for the reproduction of a tooth cavity, as I see them at the present time are: *First*, sufficient separation where the cavities are located in the approximal surfaces or a displacement of the soft tissue by compression when the margins are under them. *Second*, a proper cavity formation, to permit of the withdrawal of the impression without defacement or distortion. *Third*, the selection of a material for forming the cups or trays, that possesses sufficient rigidity to maintain its shape and at the same time flexibility enough to permit of accuracy to bending to the required shape and of a thickness between 30 and 36 gauge. *Fourth*, an impression material which softens at a low temperature, sets rapidly and brittle enough when set to break rather than pull or warp in its removal and above all capable of an imprint of the finest lines. *Fifth*, the proper investment of the impression when secured, to permit a thorough condensation of the material used for the resulting die. *Sixth*, the selection of a material for the die, which shrinks the minimum, if at all, and possesses the maximum strength, at the same time like the impression material,



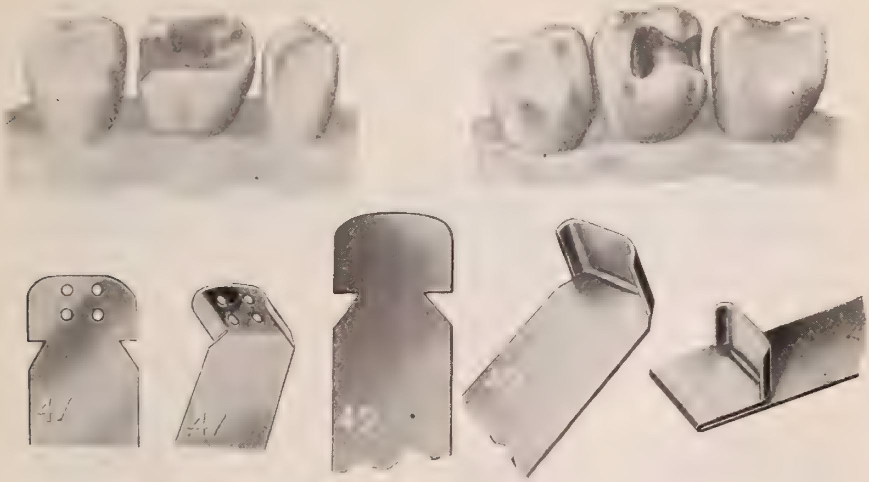
Nos. 37, 38 and 39 show a condition requiring a very different kind of tray, which is represented in Nos. 40, 41 and 42.



No. 43 represents a M. O. D. cavity in a bicuspid, and No. 44 is the tray for such an impression.

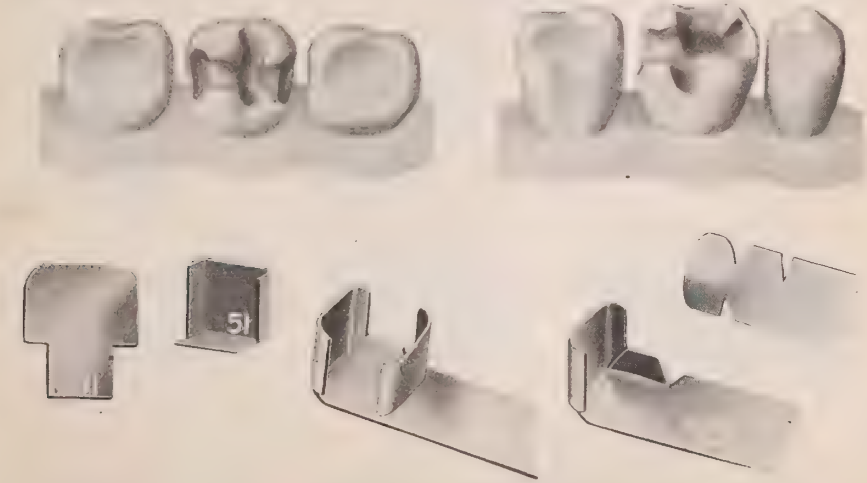
No. 45 shows such application, No. 46, a D. O. cavity, No. 47, tray for same.

capable of the finest differentiation in the imprint and an ease of separation from the impression without injury and of a color that shows clearly any defects that may be present.



No. 48, a M. O. cavity, and No. 49, its tray.
No. 50, a M. O. D. cavity in a molar, and No. 51, a tray.

Careful analysis of the numerous materials suggested to meet the requirements of the above would involve a paper requiring much more time than has been allotted me, hence I must be content in presenting those selected, as in my opinion best suited for the purpose sought. In the first, that of separation, I have found the silk line in nearly all cases

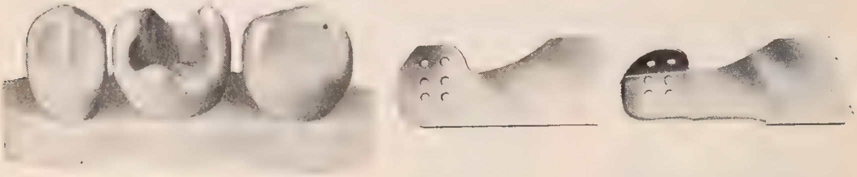


No. 52, a D. O. and L. cavity, and No. 53, a tray.

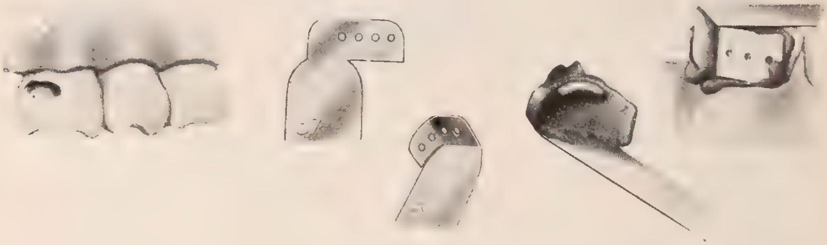
the most practical, humane (and if it is possible) pleasing to the patient. It produces little or no soreness, is not unsightly and when properly adjusted, *always* stays where it is put. By this method, teeth may be moved to a position which permits of much more convenience in the securing of an impression and assures the restoration of the interproximal space.

For the compression of the gum tissue where cavity margins are below them, I find the temporary gutta percha stopping preferable to the other methods.

The second requirement is of very great importance and cavities should be so formed as to have sharp and well-defined margins, as nearly at right angles to the pulpal wall as possible, and possess a draught just sufficient to permit of the withdrawal of the impression without distortion.

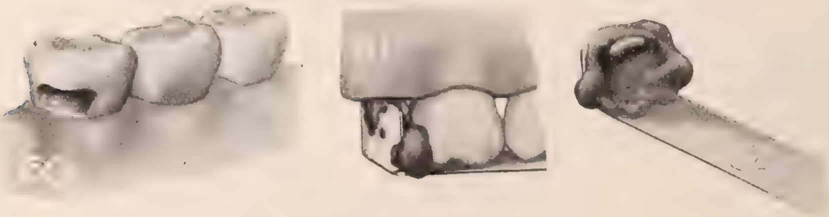


No. 54, Bucco-Occlusal cavity, No. 55, tray.
No. 56, a Distal Bucco cavity.
No. 57, a tray.



Nos. 58 and 59, tray in position and result.
No. 60, a distal cavity on the third molar.

In the third condition, after many experiments with both hard and soft brass, copper, aluminum, steel, German silver, etc., I have selected as meeting most of the requirements, metal known as platinoid, for the forming of cups or trays. The others fall far short of the requirements. German silver, however, would be my second choice.

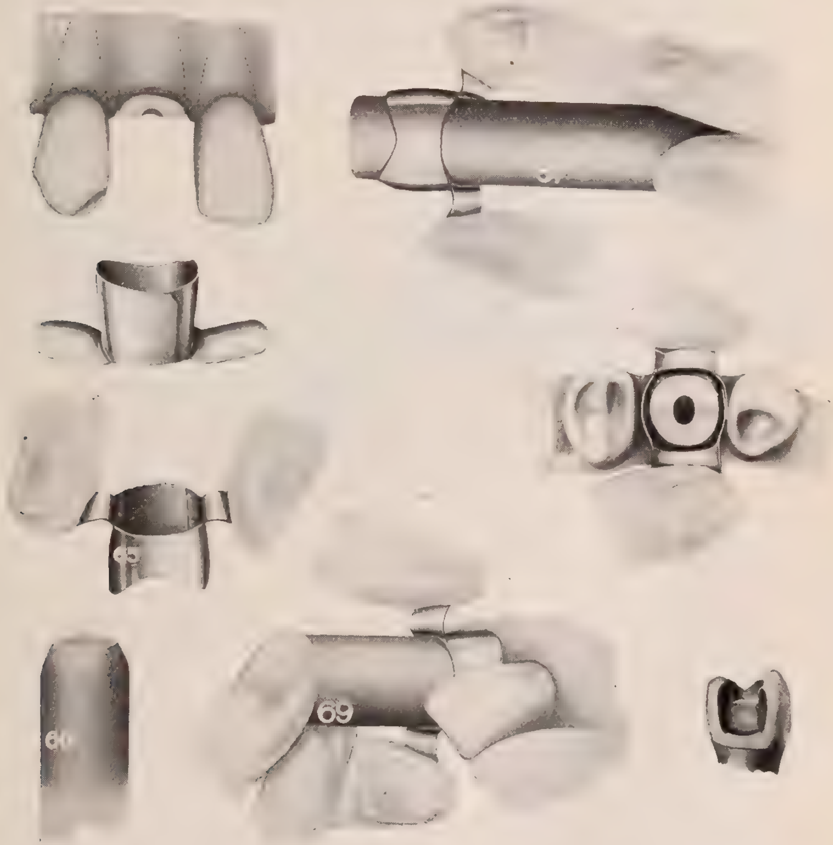


Nos. 61 and 62, tray in position and result.

There is probably no requirement named above of more importance than that of the fourth, and after a number of years of careful investigation, I am led to believe the Kerr compound possesses all of the qualifications named under this head.

Fifth, is simply the placing of the impression into the plaster to a sufficient depth to form a wall around the entire cavity margin.

If the deductions named in the five requirements above are correct, the whole operation may easily prove a failure if the sixth is not complied with in full. Any attempt to depreciate this part of the procedure, such as the use of cheap materials, because it is not used in the mouth, or careless manipulation of the best, for the same reason, is bound to result in disaster. No plastic was ever placed in a tooth cavity that required more careful or skillful treatment than does the filling of an impression for the reproduction of a tooth cavity. I have heard it stated repeatedly that any cheap amalgam or cement would do for this work. But this is not true, as for a successful issue, all the requirements stated under this head must be complied with and the manipulation of the selected material must be carefully and skillfully accomplished to obtain the desired results.



Nos. 63 to 69 show a method of obtaining a correct impression of a root end for swaging a cap in crown work. It will be noticed in all cases as shown upon the screen the trays are designed to produce the right angle pressure upon all cavity margins. After securing a correct impression, it must be properly invested for the filling with amalgam. No. 70 gives a very clear idea of this.

As before stated, it is impossible in the time allotted to deal with the varying qualities of the different materials suggested. Hence, in the following, I simply confine myself to the material I have selected for this particular purpose. I have been unable to secure as perfect results with any of the materials for producing the die to equal the silver-tin amalgam. My personal preference is that known as True Dental Alloy. The technic or manipulation of this material is best exemplified in the description of the lantern slides which will follow. There are one or two principles involved, however, which I desire to impress upon you, the most important of which is, that in all cases where an accurate impression is expected, a cup or tray must be formed to produce as nearly as possible an equal right angle pressure upon all the cavity margins. This principle was first pointed out to me by that great benefactor and genius of our profession, Dr. William H. Taggart. His method was to form a cup or tray approximating the margins of the cavity into which he placed a suitable amount of Kerr Compound and secured from this an impression of the cavity and surrounding parts. This was chilled and removed; then with a fine bunsen or alcohol flame, the surface of the compound which came in contact with the cavity and tooth, was very rapidly reheated and replaced in the cavity, depending upon the hard part of the compound surrounding the soft part to produce this equalized pressure at the point named. My only objection to this is that it requires a skill and dexterity which many of us lack. Hence, the application of the principle to the method shown later with eminently satisfactory results.

No. 71 shows the most practical method of mixing the amalgam to a perfect plasticity.

When an accurate impression has been obtained, extreme care must be exercised when filling with amalgam. This cannot be accomplished after the method employed in the insertion of the same material for a filling in the tooth cavity. Amalgam properly prepared for the latter is too hard for the impression material which will not stand the pressure of burnishing required. To overcome this, a small portion of the amalgam should be mixed very soft and very thoroughly and lightly burnished over the surfaces of the impression with instruments that will not cut or mar the compound should it go through the amalgam in the process. After the surface is entirely covered, the balance of the impression is filled with a drier mix which will absorb the excess of mercury from the former. If, however, there still remains an excess, it is easily eliminated by folding a small piece of rubber dam into a pad, place it on the amalgam and with the thumb and first finger, squeeze out the same. This should be allowed to stand over night, when the separation of the die from the investment and impression is easily accomplished by splitting the plaster with a knife or chisel, then placing it in hot water for a minute or two. The die is then readily removed from both and the result should be an exact reproduction of the tooth cavity. In a large majority of cases where defects are shown in the die, upon careful investigation, it will be found that the same exists in the cavity itself.

This brings us to the lantern slide demonstration, which I sincerely hope will make clear my deductions in these operations, as well as any defects or deficiencies that may exist, which I shall be pleased to have pointed out to me, that I may profit by and achieve a nearer state of perfection in my future efforts in this direction.

184 Joralemon Street.

CAVITY DESIGNS*

BY J. V. CONZETT, D.D.S., DUBUQUE, IOWA

When the gold inlay was first given to the profession I made the prophecy that in four or five years we would begin to reap a magnificent crop of failures, and we hear tonight from one of the foremost inlay men in the profession that that time has arrived and that men everywhere are abandoning the inlay and going back to the filling. That that is partially true admits of no doubt. It is a fact that there is a large number of failures in the making of gold inlays, but the men who are making such failures are the same ones who were constantly making the failures of gold fillings, and for the same reason. Too many men are looking for an easy road to success and are not willing to pay the price that success always demands, that is, *hard work*. No man ever succeeded in the highest sense of the word that did not put effort into his life and work.

I heartily wish to commend Dr. Van Woert's paper and congratulate the essayist upon the production, but more than that I wish to commend his zeal and painstaking endeavor in attempting to idealize the method that he is adopting. And in discussing his paper I do not wish to be thought critical in any degree, for I heartily agree with most of what he has said, and if I seem to take issue with him it is that the points that I wish to bring out may be more perfectly emphasized.

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*Symposium of papers following lecture by Dr. Van Woert, given at Ohio State Dental Society, December, 1913.

The analogy of the failure of the porcelain inlay does not seem to me to be well taken, for the failure of the porcelain inlay is one that is practically universal, in the hands of all men. That is, it is not that it is not possible for us to save teeth with the porcelain inlay, for in the hands of the men who know how to use it intelligently, it is saving teeth, but the failure is an esthetic one, for we knew that in the hands of the most expert we have the unfortunate black line in a shorter or longer time, and to the patient who has had the assurance that the porcelain would not be detected it is a very great disappointment and a never-failing source of chagrin to the operator. It is true that from time to time we will have some porcelain inlays that will look beautiful for years. I have some of those in my practice, and so have you, but in the majority of cases the black line appears to our intense disappointment. If the inlay fails through a falling out of the inlay we have a condition without decay, for rarely do we find decay about an inlay unless the cavity preparation has been so bad that the margins of the cavity are very much within the areas of susceptibility. In the gold inlay, so far as my observation has extended, the failures come from a falling out of the inlay. Here there is no change in the appearance of the inlay and we do not have to apologize for any change of appearance that has taken place. The inlay is good until it falls out or there is a recurrence of decay around it and, as I have said before, in all of my experience I have found very few inlays that had a recurrence of decay around them certainly not one-tenth as much as about the gold fillings that have come to me in the same time, so I take it that the failures that have been mentioned are the failures that have come along the line of the inlays falling out. And I am going to admit that there are many such and we are seeing more of them every day as the method grows older, but the fault does not lie in the method, for there has no method been given to the profession that is more pregnant for good than the gold inlay. It is not the lazy man's method, however, and the man who thinks that he can take a warm piece of wax, daub it into any cavity, cast it in any manner and think he is going to be successful is going to be badly disappointed, and I am glad if he is. I am glad that the cast inlay does require some care in its technic, for it is only by striving that we arrive—"to him that overcometh is given the crown" —and if the time ever comes when by any method we can accomplish our purpose without work, at that moment will begin the decadence of the profession as a whole, and the character of its component individuals.

Gold inlays fail, then, by reason of their loss from the cavity and not from a recurrence of decay, except in a small percentage of cases. What then is the reason of such loss of the inlay from the tooth in which it has been placed? Is it a faulty casting, a faulty making of the model, a faulty cementation, or is it a faulty cavity preparation? If my observation is worth anything the answer is that in the large majority of cases it is a faulty cavity preparation. Dr. Black has given us his method of cavity preparation for the insertion of the gold filling, and with little or no change the same methods are applicable to the cast inlay. We must first study the condition that we are called to correct and then, in the light of the knowledge that should be ours, by reason of a study of the methods of scientific cavity preparation, adapt those methods to the case in hand. In the making of an inlay, as well as a filling, we must observe the doctrine of extensions for prevention, for margins of tooth substance that lie within susceptible territory will decay whether they lie immediately contiguous to an inlay or a filling. And here is one of the points that I have most frequently been called upon to criticize in the cavity preparation for the reception of an inlay, for a great many operators seem to think that it is necessary to have the cavity more or less cone-shaped in order that the wax will draw and the inlay go to place; consequently, in making their cavities the occlusal surface of the cavity will be sufficiently broad, but the lines of the cavity will converge as they approach the gingivae and we will have a cavity in which the bucco and linguo-gingival angles are away within the embrasures and the margins in very susceptible territory. This form of cavity is wrong for two reasons: First, it violates the doctrine of extension for prevention, and second, it makes a cavity that offers very little frictional resistance to stress. If we are to have any large degree of success in the retention of our inlays we must have frictional resistance, for no cement has yet been devised that is strong enough to retain an inlay without mechanical assistance, therefore, all cavities should be so made that the greatest degree of mechanical retention will be given to the inlay. The first great law that we would lay down in the preparation of a cavity for an inlay is that the cavity should be so made that the finished inlay could not be displaced but in one direction and that the direction opposite to the stress that will come upon it. The best method of obtaining the maximum of resistance to the stress of both thrust and pull is the method of parallel walls and flat seats. The paralleling of the walls gives the greatest degree of frictional resistance that it is possible to give to an inlay, and the flat seat gives to the finished inlay a stability in the resistance of thrusts that is not obtained in any other way, besides many other points that time will not enable us to elucidate at this time.

The cavity must have sufficient depth if we expect any great degree of retention. Many of the failures that I have seen have come through a failure of the operator to cut his cavity deep enough, many times the cavity hardly extends through the enamel. It is not possible to lay down any definite rule for the depth of every cavity, for no two cavities have the same amount of stress to resist and it would be obviously unnecessary to cut as deeply for a cavity that did not have any stress to resist, that is in a tooth which had no occlusion, as it would be for one upon which the stress of an occlusion of two hundred and fifty pounds was to come. However, all cavities should be cut deep enough to offer a sufficient resistance to whatever stress might come upon the inlay that was to be placed therein.

Lastly the cavo-surface angle is a most important part of the cavity preparation and upon its preparation will largely depend the permanency of the inlay's resistance to the forces that make for decay. The cement will protect the tooth for a long time, even though there is quite a discrepancy between the inlay and the tooth, but in proportion to the failure of the inlay to approximate the enamel margin, will be the time when we will have a dissolving out of the cement and the train of symptoms that will follow in its wake. If the enamel margins are properly beveled, thereby making a flange upon the inlay that is made to fit the cavity, the highest degree of safety is provided against a discrepancy around the margins of the inlay, for this flange can be burnished down to the tooth after the inlay is cemented to place and before the cement has set, thereby making the least possible thickness of cement between inlay and tooth and the closest approximation of metal and tooth.

There is no difficulty in the making of a wax model if the proper methods are followed. It is true that the septal tissue is more resistant than soft wax, and if a mass of soft wax were carelessly pressed into a cavity in which the septal tissue was above the margins of the cavity, we would obtain a very indifferent model, and if we were to allow the patient to bite into that wax we would further distort it. I am not surprised that men who follow such methods have so large a degree of failures. The wax that is to be used in the making of a model should be one that is hard at mouth temperatures, and I would immediately discard one that I found it necessary to chill in order to remove it from the mouth. The wax should be warmed and drawn into a long cone and then introduced into the cavity, and with the thumb and index finger of the left hand the wax should be pressed into the cavity from the buccal and lingual surfaces, while it is being vigorously kneaded into the occlusal surface of the cavity with the index finger of the right hand, this continued kneading being kept up until the wax is perfectly hard. In this way several very valuable things are being done. In the first place the natural shrinkage of the wax is being overcome, for as the wax hardens and shrinks upon itself, more wax is forced into the cavity to take the place of that which has shrunken, and when the wax is hard we have it most nearly in its natural condition.

In the second place the wax as it hardens obtains sufficient resistance to force the septal tissue out of the interproximal space and we have no trouble with the gum displacing the soft wax; and in the third place, in having a wax that is hard at mouth temperature, we do not chill with cold water, thereby causing an additional shrinkage, but the wax, as it cools and hardens at the temperature of the open mouth, is in a more nearly mean temperature in which it will remain through all the processes of the manufacture of the inlay.

We do not allow the patient to bite upon the wax for we know that the force of the occlusion upon it would distort it and we would not be so liable to have a perfect fit, therefore, we carve the occlusal surface according to the articulation, carve the inlay to contour and remove.

In tests which we have made out of the mouth we have had no difficulty in making inlays, the margins of which were so good that no discrepancy could be seen with the naked eye. It is true that perhaps by no method can you approximate the margins of the tooth so closely that a glass of low power will not detect the discrepancy, but that does not invalidate the inlay, for not only do clinical results vindicate the claims of the inlay, but we know that it is impossible to compress cement more than one one-thousandth of an inch, therefore, if there were a closer approximation than that there would not be room for the inlay to properly seat, so we know that the inlay as made by a careful technic can be made to so fit the cavity that it will permanently hermetically seal it; and we know that with a proper cavity preparation we are able to so lay hold upon mechanical principles that the stress that will come upon the finished inlay will not be able to dislodge it.

Again I want to express my appreciation of the genius and patience of Dr. Van Woert in elaborating the system that he has given us, and to assure him that his work has been of value to me in the past and I am sure it will be of greater value to me in the future.

MODEL METHODS*

BY E. B. SPALDING, D.D.S., DETROIT, MICH.

Dr. Van Woert's lucid descriptions and numerous well-selected illustrations in the journals, as well as in his paper today, make his reputation as a teacher vie with his renown as a skillful operator.

Some of us have been fortunate enough to have had a glimpse into his office and have seen him at work and admired his skill and the results he obtains by this model method. I consider an afternoon spent with Dr. Van Woert some four years ago as one of great inspiration to me. At that time he accomplished my conversion to the impression and model method and I know that this complete system he has so clearly given us today has been the result of years of work in developing and testing its value.

The prophecy of the essayist that "unless some reliable and practical method for the production of the cemented filling is secured, it will suffer the fate of many other valuable discoveries and become a thing of the past," has a ring of truth in it when we consider how almost forgotten, from the standpoint of use, is the porcelain inlay in most dental offices today and the gradual lessening of interest in the gold inlay.

Is it that the inlay filling lacks the merit it was once supposed to have? I think not, but I do believe that it is because the technic in the mouth is too exacting.

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*Symposium of papers following lecture by Dr. Van Woert, given at Ohio State Dental Society, December, 1913.

When Dr. Riggs, in 1844, or thereabouts, convincingly demonstrated that pyorrhea could be cured by thorough instrumentation, why has not the majority of the profession successfully treated the disease all these years? Is it not because the technic of the work in the mouth was too fine and laborious?

Why was cataphoresis for desensitization so short lived? It *was* and *is* efficacious and patients appreciate its use but the technic in the mouth was too exacting and time-consuming. There will always be a certain few who are willing to master the finer details of almost all these exacting procedures, but the majority are "too busy."

If Dr. Van Woert could have given us this paper ten years ago there would be very much more porcelain used as a filling material today than there is used. However, I believe the impression and model method is going to do much towards a reawakening of interest in porcelain and will also increase the use of the gold inlay rather than make it more complicated, as many suppose.

It has been my privilege to interest a number of men in the impression and model method for inlays and crowns and they have all said that it has improved the quality of their work and they are continually finding more uses for it.

For nearly all impressions Dr. Van Woert uses a tray especially made for each case which carries the modeling compound to place in the cavity.

We know he is successful in this procedure but personally I have not been able to get as satisfactory results by this method for approximal cavities as by using a specially-made matrix for each case, placing it in position between the teeth and using rather a large cone of the modeling compound. I think this is the method of Dr. Henry W. Gillett. The cone is heated so that the point and outer surface of the compound, cone end, is quite soft, but the interior is still hard, or at least very resistant, and which acts as a piston to force the soft portion into the cavity surrounded by the matrix. In this manner I feel that I can get greater pressure in condensing the compound into and against the walls of the cavity, at the same time covering a considerable part of the tooth outside the cavity. The pressure should be decided and firm and held for probably thirty seconds when the fingers can be released and the whole mass chilled with cold water. Where there is a mass of the modeling compound it takes a little longer to thoroughly chill than when a tray is used with a small amount of the compound.

When I first began taking impressions it was always a mystery to me why air was not confined in some portion of the cavity, but I have rarely found a case where the air was not completely expelled from the cavity, if the compound was soft enough and considerable pressure was used. The removal of the impression usually takes some force and sometimes it is necessary to trim away excess of compound to allow of removal.

The fitting of the matrix should be carefully done so that it slips beyond the gingival portion of the cavity or the modeling compound will not go over this margin. It matters not how far under the gum the cavity is if the matrix goes over the margin for the compound will follow it. I am speaking of approximal cavities in bicuspids and molars.

For the matrix I use a strip of platinoid 36 gauge, probably a third wider than the cavity. One end is rounded and slipped uprightly between the teeth and over the gingival edge of the cavity and under the gum if the cavity is below it. Then the free portion of the metal is bent back over the adjoining tooth. This bending over the neighboring tooth is to prevent crowding the matrix further into the gum when the modeling compound is forced to place and thereby causing discomfort to the patient, and injury to the peridental membrane.

The portion of the metal then extending out from between the teeth is bent towards the tooth to be impressed, forming a box to confine the compound. The metal is removed from the mouth, of course, to do the bending. The matrix should be of material thin enough so it will spring away from the gingival portion of the cavity and allow the compound to pass over and beyond the edge. When the impression is removed the matrix may be separated from the impression but, if necessary, it can be replaced on the impression and caught by melting a little of the compound with a hot burnisher at any convenient point.

A class of cavities of which at first it would seem very easy to obtain a good impression, viz: the labio-cervical when one edge is under the gum, was probably the hardest for me to master. Of course, as Dr. Van Woert suggests, they may be packed with gutta percha for a time when the gum will be crowded back, making the procedure simple, but that requires an extra visit for the patient which I now usually find unnecessary.

If a blunt cone of compound is forced into the cervical cavity the gum, instead of being forced away from the edge of the cavity, is merely bent over on to the edge and into the cavity and the edge not exposed to the modeling compound is not outlined in the impression. By using a cone of compound as fine as a lead pencil point and softening quickly for about a quarter of an inch from the end, if inserted quickly to the center of the cavity, will strike the floor of the cavity going in all directions towards the walls, running under the over-hanging gum and beyond the edge of the cavity. After the first thrust of this fine point into the cavity the bulk of the cone may be firmly pressed against the gum with no fear of it not being pushed back.

After an impression has been secured it is wise to drop immediately into a small glass of cool water so that if it stands in the laboratory before being packed it will not be exposed to any undue heat, as an overly-warm room or a draught from a bunsen burner which would likely change its form or dull its sharp lines.

The impression should not be removed from the water and invested until it can be packed with amalgam as soon as the plaster is hard enough to permit. For the die I am using True Dentalloy, the same as Dr. Van Woert, though I did not know what he was using until seeing his paper.

I can not add anything to what the essayist has said as regards the packing of the impression, except perhaps to emphasize care in the investment of the impression so that it is thoroughly supported or embedded in the plaster. If there happens to be a small crevice between the impression and the plaster, when the impression is packed with the amalgam the free mercury will be tapped out into the crevice and remain there until the model is taken out the next day, when the mercury is liable to attach itself to the model and soften it. For point of contact and bite I have given up the use of wax as too indefinite and am using modeling compound instead.

Dr. Van Woert has said "In a large majority of cases where defects are shown in the die, upon careful investigation it will be found that the same exists in the cavity itself."

If a man is prejudiced against the indirect method but would try it for a time, I believe he would learn enough more about cavity preparation to repay him for his trouble, and I am quite sure he would also be a convert to impression and models.

Proper cavity formation is a matter of considerable study and there is no easier and more convincing way to study the subject than from the model of each cavity we prepare. I know that when I began the impression method, nearly four years ago, I was astonished at the imperfect form of some of my cavities after seeing the models. I thought while preparing them in the mouth I was making a fine mechanical form for retention, but the model showed the form most faulty. In several instances, when the patient came for the setting of the inlay, I re-prepared the cavity and took a new impression.

The well-trained laboratory assistant is becoming a necessity to more dentists every day as they learn her possibilities. I do not refer to the ordinary office girl nor to the mechanical laboratory man who has learned his trade in the commercial dental laboratory, but to the assistant, usually a young woman, who has been carefully trained by the dentist to do, nearly, if not all, his mechanical work according to his ideas. In much of her work she becomes more expert than the dentist himself. If a dentist becomes proficient in all the delicate operative procedures that are expected of him he must be relieved of much, if not all, the detail of constructive work outside the mouth. If he is not relieved of it his ability as an operator is very much handicapped.

After a correct impression of a cavity is obtained the making of the model and the construction of the inlay, either gold or porcelain, may be done by a competent trained assistant, the work being submitted to the approval of the operator from time to time if he wishes.

In this way we are able to give our patients better service by using the methods of Dr. Van Woert without over taxing ourselves. The leader of the orchestra does not try to play all the instruments.

REQUIREMENTS FOR PORCELAIN*

BY A. E. SCHNEIDER, D.D.S., CHICAGO, ILL.

For me to discuss the technic of this paper just read by Dr. Van Woert would be unseemly, for I entirely coincide with its essential details, so in my discussion, from a porcelain viewpoint, I have been given considerable latitude by your committee, so as to include, to some extent, my clinical efforts before you at this time. Consequently, I will include with the tooth cavity reproduction, the entire reproduction of a tooth's enamel: Porcelain Jacket Crowns.

Of most importance in either preparation, is initially the correct preparation of the tooth for the reception of the tooth restoration.

There is one feature common to all, and that is a square abutment of the porcelain with the tooth surface; this requirement means much, as regards the invisibility of the union of material and tooth, when the shade is considered and is decidedly a strength feature, if well done in all cases; paralleling the requirements of all glued joints.

The most essential feature of all cases is the tooth's preparation and herein is displayed one's real mechanical sense and ability, for upon this step must we rely for permanence of retention.

With regard to fillings, there is no set rule that one can follow, but in the case of the jacket crowns, there is only one rule that applies to all cases, and that is to follow as accurately as you can the general outline of the dentine under the enamel of the tooth being prepared.

In the porcelain fillings that have come under my supervision in the last fifteen years, the greatest fault has been the beveled margin, which usually shows a chipped porcelain or a broadened cement line, detracting from the otherwise correct shading of a tooth.

Again, in the majority of cases, after a lapse of three years and upwards, the tooth itself has darkened, leaving the filling conspicuous.

Many, many cases are at fault in the form of their retention. These faults have led me to adopt this procedure: Where a third of a tooth's visible surface is involved in the preparation of a cavity, I do not hesitate to denude it entirely of enamel and place thereon a porcelain jacket crown. This may seem radical to many, but when you consider the extent of cavity margin, the greater ease of attaining the correct shade, the attainment of greater strength of your finished product, and finally the ability to hide the union of porcelain and tooth structure under the gum, wherein the union of tooth and material is just as neat as in any case of filling, I truly feel that I am giving my patients better service.

Also where one attains the correct contour of the tooth, and the correct shade, even though the other teeth in the mouth do become darker after a time, these crowns, because of the way in which they take up the rays of light from without and within, will correspond well with the other teeth in color, even though they have turned several shades darker.

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*Symposium of papers following lecture by Dr. Van Woert, given at Ohio State Dental Society, December, 1913.

To get the best results in the making of jacket crowns, the inverse method is by far superior, and to get these results, it is imperative that the tooth impression should be taken with Detroit Modeling Compound, confined in a container. This does not mean that I condemn the use of the Kerr Compound, but that I know the Detroit Compound and its excellent working properties better and that it fulfills my every desire as an impression material.

For this purpose, I make for each case a separate container, virtually a copper crown. Into this I place the compound. By using dry heat, I soften the material and force it over the prepared tooth, until the cup has passed beyond the shoulder prepared around the tooth, at least three-tenths of a millimeter, then I cool with cold compressed air and retain the pressure upon the cup to obviate and overcome the tendency of warm compound to "ball."

Remove gently and avoid lateral strain. A mush bite of the prepared tooth and its counterpart on the opposite side of the arch is then taken with extra tough pink wax, also contained in an oiled tray. This is likewise chilled and the tray removed, when with a hot-air syringe the occluding surface is warmed sufficiently to allow the opposing bite to be taken without distorting the first wax impression.

The individual cup is now packed with cement of the proper handling consistency and built up to simulate a root. In this again I am slightly at variance with the Doctor, but this I consider only a matter of the technical knowledge of the proper handling of one certain material, which leads one to perfection in its handling.

After this hardens, the cup is again heated and the compound is removed from the cement. The cement is then trimmed from the shoulder, root-wise, so that when it is placed into its imprint in the wax and both sides of the articulation run up in plaster, it can be readily removed from the hardened plaster model.

Having the exact reproduction of the case under consideration, it is much easier to build up the crown than where one attempts to burnish platinum direct to the tooth in the mouth. A perfect-fitting matrix is now made by folding platinum about the cement model and binding it on the lingual by what is termed the double lap or tinner's joint. All excess being trimmed away, burnishing is resorted to. I use a small metal ball burnisher, working from the labial to lingual, both mesially and distally and finally burnishing the joint, which locks the metal to position.

Upon this is then built the jacket crown, resorting to the model to attain correct contour and contact. This crown can usually be finished in one complete fusing of the porcelain. To do this requires an education in the handling of your product, as it involves the knowledge of the working properties of your material, getting especially the "feel" of porcelain under your spatula, so that you can accurately determine the density of the porcelain before it is ready for baking.

Knowing your porcelain enough to gauge the amount of shrinkage that is involved and allowing for the same, is not a hard step in the making of these crowns, provided you fortify yourself with a complete knowledge of the working properties of your material.

The color problem in jacket crowns is not a hard one, if you will not allow the previous intricacies of color laying to worry you. There should really be but ten colors in any set of porcelains. The yellows, which are but variations of the chromatic orange coloring, should consist of the light, medium and the dark shades; the grays also light, medium and dark shades, with the addition of a pinkish gray, a greenish gray a dark muddy gray and a chalky white.

With these colors, one could match any shade in any shade guide, and in the most of the cases with but two colors, varying only the thickness of the one or the other colors, the yellow, or gingival color under the grays or the incisal colors; one over the other.

In conclusion, the setting of these crowns, in most all of the cases with a cement the color of the gingival coloring of the crowns, of a thick creamy consistency, filling the crown and gently forcing it to rest upon the shoulder, gives one a finished restoration, the like of which, prophylactically and esthetically, I do not believe can be equaled in any other of our dental procedures outside of porcelain.

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COMPLICATED CONDITIONS*

BY KARL G. KNOCKE, D.D.S., CHICAGO, ILL.

Some time ago I was asked by your president to give a clinic on "Anchored Dentures and Removable Bridge Work," showing several methods of attachment that we have been using and with which we have met with great success. I made preparation for this clinic, never dreaming that I should have to prepare a discussion of so splendid a paper as we have listened to this afternoon. A week ago I was startled and overwhelmed when notified that I had been placed on the program for a discussion. Your president promised me that I did not have to stick absolutely to the subject, but to talk about the things nearest and dearest to me. I have heard many discussions opened by remarks such as I have just made and they always sounded foolish, so I will amend my remarks by saying that I am going to talk, and talk as much as I can, and maybe you all will be glad to have me stop. I am trying to explain why my discussion will appear rather disjointed and away from the strict text of the paper. One man told me a few days ago that in discussing a paper it was necessary at least once to mention the subject under discussion and then it was customary to get as far away from it as possible. However, I will try to do the best I can in giving my discussion.

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First, I will have a few things to say in actual discussion of the paper and then will go as deeply into the subject of the side that pertains to castings for bridges, etc., as possible.

I will be candid and say that I have been and am yet fully an advocate of our so-called direct method. It has always seemed to me that if we could get an impression, which includes many more areas than the wax filling we wish to reproduce, to remove without distortion or mutilation, we could certainly remove the wax filling itself perfectly. However, I am always more than willing to be shown whereby I can improve on the work now being done. I believe that the indirect method, so-called, is one of greater ease and convenience, and that probably we are better able to see just what we are about, but I believe that with the same care and attention to details that are necessary with the indirect if carried out faithfully with the direct, we will produce just as perfect and possibly more perfect results. I cannot believe that we can ever obtain from an impression a model as perfect as the tooth itself. However, I have changed my work so often that I know nothing is so perfect that it cannot be improved upon. A few days ago, when I had placed a well-fitting, non-irritating, fixed bridge in the mouth of a patient, I stood back and felt it was perfection, and today when, with the experience, associated with Dr. A. F. James in a large pyorrhea practice, I see what one can see in such a practice, I feel absolutely assured of the fact that a bridge should and must be removable in order for us to do the most good in mouths where a structure of some kind is necessary.

Our geometry teacher in high school, who was of a sarcastic vein, used to say that "if you would throw feed to chickens, even a hen would know that a straight line is the shortest distance between two points." So I believe with our work; the fewer steps interposed between the tooth, the wax and the casting, is the better, shorter and surer way.

It is my conviction that skill, care and attention to detail being equal, the best results are to be obtained by the direct method.

I think many of our failures have come, not from failure of the wax model, but from such things as careless investment, use of scrap golds of which we know little, and most of all in our attempt to finish the entire inlay out of the mouth. I know one very careful operator in other things who forces a mass of wax three times too much for the requirements into, not only the cavity, but into all surrounding parts, then roughly trims the wax, leaving a large excess at all the margins, not attempting to finish or polish his wax while in the tooth. He then removes the wax and with a sharp knife trims it down to margin, casts and polishes inlay on the lathe buffer. How much of his margin is perfect?

In view of this, I want to explain a few experiences of our own in the office. All of our crown and bridge work is removable or anchored denture work. I want right here to give you my distinction between the two classes so you will know better what I mean when you hear my talk tomorrow and Thursday. In order to have a clearly defined difference between the two terms that are used synonymously, I call all those cases that are truly bridges, a span of space between teeth supplied with removable work, such as the Corcoran method, which the dentist himself removes, or the Ash method, removable bridges. While all those cases in which saddles are used are under the care of the patient, such as the Gilmore, Roach, Kelly and scores of others, I call anchored dentures, since they are simply anchored in place with a purpose of retaining them in the mouth.

The Corcoran and Kelly attachments or principles which we use in great majority require such fineness of adjustment and accuracy of fit that the difference of a forty gauge is enough to disturb it all. They require, as we make them, an accuracy of fit as fine as the inlay itself. Every bit of this work as we do it requires casting except the coping itself which is swaged always. Never do we use bands in our work. We are continually removing bands or extracting the teeth to which they have been applied for reason of the pyorrhea caused by them. Now the method of procedure in this casting work is as direct as can be unless we were to cast direct to facings, which we tried hard to do, proved to be a failure and stopped long ago. The wax is applied to the facing, surrounds the cylinders or the Corcoran box, the facing and box removed and the wax reproduced in gold. Now this is the point I wish to make here. We can never attempt to cast a portion involving two or more of these attachments, for the reason that the shrinkage, in the direction of greatest bulk of the gold, causes a misfit and here I believe is the kernel of our troubles. I firmly believe that care and attention to detail being equal, we can get an absolutely perfect model and that from then on our troubles begin, and they are just as great in the indirect method as in the direct.

I think that the cause for failure of an inlay to reach the gingival margin of the cavity is due, not to a fault in the wax model, but lies altogether in the steps that follow and they are the same in the direct and indirect. Our manipulation is sometimes painstaking up to that point and then careless from then on. Then, too, in regard to the fitting of the facings and of the part to the attachment it was made for—the facings unless beveled, will hardly ever fit at all, and even when beveled are hard to fit. This matter of warpage of investment and shrinkage of gold—again the direction of shrinkage is in line with its greatest bulk of gold, and we find the gold hugging the bevel long before the facing is anywhere near to place. The same is true of the portion that fits the coping.

The casting to facings failed. Why? Because the gold shrunk or warped so much as to pull the facings nearly in two. So with our castings;

the gold margins cast to cover the bevel on the facings are, as it were, crimped in by this shrinkage so that we have our greatest trouble at that point. Here we have a perfect wax piece from which the facing is removed many times and then replaced and still the facing never does go to place without a great deal of careful fitting. At this point, in regard to the removal and replacement of the facing out of and into the wax of the facing, I will say that I always make it a practice to remove my wax and then, in spite of many advices to the contrary, I replace it, doing this several times in some cases to verify and fit the wax.

In order to sum up my remarks on this part of the subject I wish to say, that as far as I have yet been able to see, I could not get so perfect a model from an impression of the cavity as the tooth cavity itself presents. Also that I believe the question is not whether the direct method or the indirect method be employed, but rather a change in our technic, the addition of something to our gold that overcomes the shrinkage and more care in our manipulation between the wax model and the gold casting.

The man who is willing to say that he is discouraged to a point of giving up the cast inlay is very foolish and weak, and I wonder just what it is he will go back to, since I believe it would be a terribly big step backward. There are men who will do careless, slip-shod work, even though everything is done to stimulate them to better work, and who will be careless to the end. These men, as has been said of the poor, we have always with us, and I fear that we can do nothing for them. I believe that the more lengthy the operation the greater number of steps in the technic as required in the indirect method gives greater opportunity for the blunders of this man than the other.

The big argument for the indirect method is the convenience and ease with which we can manipulate the wax and finish the filling, but I cannot believe it possible to get an absolute reproduction of the cavity. No matter how close a fit we get, it is at least not less than 1/1000 of an inch from the cavity walls, since we cannot press anything to less than that. Now, we have that loss in taking the impression and again that loss when the wax is inserted into the model obtained, making a difference, as I see it, of 1/500 and that is absolutely as close as it is to be gotten, and if that is perfection what is it that we actually do get? The indirect method removes the wax one impression and one model from the original tooth cavity, and we are that much further from the cavity itself.

Dr. Van Woert says that many advocates of the direct method for gold are advocates of the indirect method for porcelain. The two are so utterly different that I cannot see the connection. In one, we clear our wax and burnish it to our margins and can inspect them all, while with the other the margins are completely covered, and we must work with entirely different materials, one plastic, and the other a flat sheet of thin platinum, which must be burnished into place. However, at a gathering of a few Chicago men at lunch the other day, this matter was brought up and several very prominent men, who are having great success, and have had for years past, with the porcelain inlay, who are making them both directly and indirectly, using the indirect on account of the time saved at the chair, were all of the opinion, from experience, that they could produce a far better inlay from a matrix burnished in the mouth than they ever had made from a model obtained from an impression of the cavity. One man, of very emphatic nature, and positive opinions, said that he could make an inlay from a matrix burnished in the mouth that would be better than an inlay made by any man in the country from a model.

There is one thing I would like to say in regard to the amalgam used. It has been our experience that for fineness of line, hardness of materials, especially at the fine margins, that the Copper Amalgam made by Dr. P. J. Kester, of Chicago, is far superior to any silver alloy obtainable. It seems to pack very much finer, closer and the sharpness of line is very apparent, even to the naked eye.

My discussion was to embrace complicated cases, and I am going to tell you of a few things that we have worked out by hard experience, that may help you in your bridge cases. Everything can be, and is in our office, cast and with perfect results. I know of no more complicated work than the restoration of, say, a full upper and lower jaw, with removable bridges or anchored dentures, carried by many roots, every part of which is cast, except the coping and in some cases the saddles. Such a case it will be my pleasure to show you in the mouth of one of our patients, who, while a very busy man, kindly volunteered to accompany me to your meeting. The case has only last week been placed. In fact, on Monday of this week the patient came in for his first adjustment, so that it has not yet been put into perfect adjustment, so far as the patient's being able to forget its presence in his mouth. To start with a case that requires two to three weeks' work, would require the taking of many impressions, or the making of a model from the first that would hold up through it all. Hence, we make our models of amalgam, incorporating the area under and about the copings, and pouring the rest with plaster. We use Spence's plaster, which is very hard and has practically no movement during its chemical changes. This gives a model of great strength and wearing qualities united with a minimum change of the plaster portion, during the length of time necessary for the completion of this work. Very seldom do we require more than the first model made to complete our work on.

I will go fully into the technic at the clinic, so for the present will confine myself to some of the difficulties before mentioned.

We will take up, for example, a simple operation, the making of a Richmond Crown casting. The facing, having first of all been ground to place, is then oiled as is the surface of the model in the region of the facing. The oil used should be, in all this work, a vegetable oil, since mineral oils dissolve wax to a degree, which leaves your casting rough and much harder to fit. The facing and model are oiled to permit of the placing of enough quick-setting plaster to cover the facing and area about it, and then removed. This is for the purpose of holding the facing in place as it was ground to place, while applying the wax. All parts are thoroughly cleansed, slightly oiled, the wax melted and poured into the space between the facing and coping, and the contour built out in wax. Now, right here is a point of importance, which proves that the manipulation of the wax differs greatly in an operation in the mouth from that of an operation on a model. If your model is cold, the wax will curl, draw up at its edges, as it cools, showing a very rapid contraction of the wax. For that reason, a model should be warmed to as nearly the body temperature as possible. As soon as the wax has thoroughly hardened, remove the facing by heating the end of a piece of sticky wax and applying it to the facing. This is done, because if allowed to stay in the wax to the last, the facing removes very hard, and sometimes not at all. The steps between are as usual, but carefully attended to, such as carving, investing and casting, and now we come to the rub. When casting around a cylinder, such as used in the Kelley attachment, you have to be careful that no gold enters the cylinder, since so close is the adjustment as to necessitate the recasting until you have one in which not a trace of gold has entered, if this happens. We avoid this by taking a piece of lead of a pencil, slightly larger than the cylinder; this is tapered slightly, and with a screwing motion, lightly forced into the cylinder until it has tightly fitted itself into place. To show the importance of some attention to the finer details, I will consider this piece of lead more carefully. Up to a short time ago, even though we had a remarkably close fit of the lead into the cylinder, we did occasionally get a very fine filament of gold inside of the cylinder, so fine that it seemed almost to be plated. This annoyed us a great deal, until one day I passed a piece of lead through a Bunsen Burner and discovered that as we use lead it has in it some substance, possibly water, which is driven off by heating to red heat, but which does not spoil the lead in any way. When we used this dehydrated lead we had no more trouble.

The same is done with the lead points that we use to replace the pins of the facing in the wax.

After the casting is cleaned, the piece is fitted first to the coping, which carries the attachment and when that is perfectly fitted, the facing is fitted. This fitting is more accurately done by us with the use of a black paint, which we make of Steele's Anti-Flux mixed thin with oil or turpentine. A very light coat is applied to the coping and the black marks left on the casting show the bearing and are trimmed away until the parts fit absolutely. The facing is treated in like manner, except that after having removed every bubble or rough place in the casting, it is then painted and the facing, in this case, is trimmed until it fits; so much, roughly, for the simple case of crown or bridge casting.

I have used many inlays for bridge abutments, and like every one else soon found that we had to use posts in order to retain them. I make my posts in such a manner that they enter at a different angle from the walls of the inlay and for that reason the post must be placed after the bridge has been placed. I do this by cutting the post square, and around the part that passes through the inlay I burnish a piece of platinum foil. The post is oiled, the platinum box slipped on and passed through the wax. After the wax model is finished I carefully withdraw the post, which leaves the foil box in the wax, around which the gold casts, leaving a smooth, well-fitting seat for the post, which is pushed into place after the bridge is placed and before the cement has set.

Where I do not devitalize and cut off a molar, which is our usual procedure, I make a cast crown, never wishing to use bands. The tooth is prepared as for a jacket crown, with clear sharp shoulder, right angles to the pulpal wall. Now, I have tried repeatedly to make this by the indirect method and have never succeeded, but I always have succeeded by following this technic: I make a band of platinum a little wider than the remaining crown portion of the tooth. This fits loosely and is slit at the bottom all the way around. I bend the little flares at right angles, so that they rest on the shoulder of the preparation, the other end is crimped down over the crown. I melt wax over this, seeing that it is imbedded in the wax, carve, remove and cast. I will go more definitely into the technic of casting for bridge work tomorrow and Thursday, so will sum up what I have said.

Dr. Owre, in his lectures to the student body at Minnesota, always emphasized a quotation of his own, which is, as nearly as I remember it, as follows: "Success in anything comes from close attention to minutiæ and detail." I never realized the deep importance of what he kept hammering us with, until after I had been out of school some time and had started in this work, and I believe that it sounds the key-note of all we do. We have been inclined to think the inlay and casting for bridge work easy and requiring little definite attention, but most of us found out very soon, that to be successful in this work meant harder work, greater attention to minutiæ and detail than ever before.

Let us, every one, go home and do this thing with all the fine points of technic carried out faithfully as Dr. Van Woert has given them to us, and then considering all points, let each and every one decide the question for himself. I, for one, am very willing to be shown and I will be the loudest to shout its merits, as soon as I am convinced of its superiority over what we are now doing.

I wish that every man would go deeply and thoroughly into this casting for bridge work, that makes removable and anchored denture work possible, and you all will be putting on nothing but removable and anchored work. I wish I could convert every one to this, then I would feel that I had done something today, whereby the Ohio State Dental Society had profited by so kindly inviting me to give you what I have to give.

I wish to thank the society for their courtesy in inviting me to clinic and also to discuss this paper, and I wish to give my thanks to the man who so unselfishly gives so much of his time and knowledge to the profession and who makes anything go with a vim that he takes hold of. I wish to thank Dr. Price.

DISCUSSION

Dr. Van Woert (closing): In answer to Dr. Barber's question I will say that the detail for the use of inlay wax, in the model method, is precisely what it is in the direct method. The wax should be handled with just as much care as in the direct method. It should be molded into the cavity and carved to contour and detail, less the occlusal planes and sulci, which should be done after the wax filing is placed in the amalgam die.

Dr. Conzett takes exception to the butt-joint, because of the impossibility, as he alleges, of burnishing the gold so as to protect the enamel rods. It all depends upon the extent to which he expects to burnish his gold. By this method enough of the gold can be burnished to conceal the cement entirely, just as in the case of the lap-seam or the bevel-seam. The bevel-seam, I believe, is practically more difficult to make than the butt-joint, and I do not think it is any better.

Dr. Conzett: You do not quite get my point; the principal point that I want beveled is for the protection of the enamel margins. If the cavity margin is properly prepared, I believe the butt-joint will prove just as much protection to the enamel margins as the bevel and very much more than in the lap seam.

Dr. Conzett says it is not according to his theory to allow the patient to bite into the wax for the purpose of obtaining occlusal planes. That is in direct opposition to Dr. Taggart's teaching. I cannot quite conceive of the average man being able to reproduce occlusal planes, and get them anatomically correct in any other way. This is the great difficulty—that we all have ideals, and it seems strange to us that the others cannot see exactly as we do.

There are countless numbers of men throughout the world who have abandoned gold inlays because of the difficulty of securing accuracy of fit. The point is that even with the poorly-fitted inlay, that fault is less objectionable than one that has imperfect occlusion, because that is something that can be corrected. If the filing is imperfect at the margins, that can be remedied. On the other hand, a filling that is in false occlusion is all wrong. If there be any one thing to recommend the indirect method, it is that you can get the occlusion correct.

The indirect method is in reality only one step removed from the original, the making of the die. Dr. Knocke says you have two operations to perform; the making of the filling in the cavity of the tooth, and in the die as well, which he considers superfluous. That objection simply amounts to a protest against doing necessary work to attain best results. I am not trying to convert you to the indirect method; all I want is that you who have not tried it, give it a trial. You should at least know there is such a method.

In conclusion I want to say that I believe the impression method to be the lesser of two evils. I believe the average man can get better results than by the direct method. There would be much improvement and a greater gain in the use of gold in casting. Nothing in the history of dentistry, during my career, has been of so much importance as the cast-gold filling. The cause of its decline, of late, is to be found in the fact that so many operators find themselves unable to achieve anything like the perfection they should, in the actual operation of preparing for and making the casting. We need to avail ourselves of every advantage, so that we may go about the operation with perfect confidence of attaining the best results for our patients, as well as for ourselves.

TRAINING AN OFFICE ASSISTANT FOR EFFICIENCY.*

BY A. L. LEGRO, D.D.S., DETROIT, MICH.

WHEN EFFICIENCY AND TIME ARE HELD the most potent factors in administering the affairs of a dental practice, the trained office assistant, perhaps, occupies the most important cog in the machinery. Properly trained and properly managed she is a joy forever. She thinks along certain lines for us; she acts along certain lines for us, and above all, she memorizes along most lines for us. With the proper kind of an office assistant, the operator's mind is never clogged with details, matter that can just as well be taken care of by a young woman who is made competent by careful training and just remuneration. The assistant who knows is the one who becomes a valuable asset to the operator. She satisfies, and she brings and holds business as well, and makes it possible to accept more business.

In giving all the information and instruction necessary to aid one in the proper training of an office assistant for efficiency, your essayist will attempt to advertise for, employ and train her on his own experience, feeling that there are many helpful suggestions to come from the gentlemen who are to discuss the paper that are quite likely to meet with your greater approval.

The main thing is a highly satisfactory office assistant, and it matters little how the end is accomplished. We will call the essayist's way merely one way.

In advertising for a woman to take such a position as we are now treating of, the advertisement should be so worded as to over-emphasize the fact that no one but an enthusiastic and hard worker need apply, stating just what the work is, and that the salary will be commensurate with the services rendered. This method will weed out all idlers and facilitate matters greatly. One should deliberate long before selecting and employing an office assistant, who, if she is going to be of great value to you, must necessarily occupy a very confidential position in your practice. Many women will answer your advertisement, for it seems to be the popular opinion among many of them, who, through force of circumstances or choice, are in a position to live at home and earn the few dollars usually paid by dental surgeons and physicians, that it is more genteel work than any other. This thought in their minds might render them incompetent for the position we want filled, and at this stage of the proceedings a fine measure of discrimination, experience and intuition would be of inestimable benefit.

Select the names and addresses of four of the most promising applicants. After explaining the duties in a general way, making them appear much harder than they possibly can be, at the same time explaining that your custom is to start with a certain salary and increase it as proficiency is shown; each one in turn is seated at the desk and asked to write a formal application for the position, giving age and address—and here dismissed.

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*Read before the Michigan First District Dental Society, 1913.

One return interview for each of these four applicants, and an additional interview for the successful candidate, is necessary to start things right. During each of the return interviews, each applicant is told in detail what is expected of her. She is impressed with the fact that the telephone is for business purposes only, that the office is for the practice of dental surgery, and that no visiting will be allowed. Particular emphasis is laid on cleanliness and the "keep busy every minute" motto. Introductory information should not be given in its entirety at this interview, for it tends to create a condition of discouragement, which it should not. It should only place the young woman on her mettle with the determination to do her best. She is informed that she is to be the first one in the office in the morning, and that she is to be the last one to leave it at night, after everything is in order. She knows that she is to dust after the janitor, and to be a good housekeeper. With these general instructions she is dismissed.

The return interview has given you an idea as to which one of these girls would best suit your needs, and you therefore address her and request a second return interview. This is the most important interview, and during its progress a good heart-to-heart talk in detail helps to give the applicant the right perspective, as it were. This, together with the working up of the proper amount of enthusiasm, are essential factors at this particular point. She is taught not only to hope to do well, but to do better than well. The successful applicant must be made to evince a strong desire to show as much interest in the success of your professional and business affairs, as it may relate to practice, as you yourself. She must be entirely in sympathy with you and, above all, she must be in love with her work from the very start. She is given the motto, "Know the true value of time, seize it and enjoy it." No idleness, no laziness, no procrastination. "Never put off until tomorrow what you can do today." She is told that as time goes on she will be taught the proper care of the operating room, names of instruments, proper methods of sterilization, keeping up stock, bookkeeping, collecting, determination of values, letter writing, quotations of prices, classifying catalogs and special prices, getting credit reports, collecting statements, banking, instruments by number, proper place for each instrument, care of burs, making appointments, favorite hours of different patients, care of patients in reception, dressing and operating rooms, making models, investments, casting, polishing, etc., initiative, and anticipating the operator's general movements.

She is told that when any error occurs in her duties that her employer will stop his own work and, in a well-meant way, correct her, and tell her or show her how such an error can be remedied. She is made to understand that "courtesy, personal immaculateness of character and body, identification of personal and employer's interests, attentiveness and knowledge of all phases of her particular duties, and the cultivation of the health habit," are all attributes of the successful assistant, and their attainment is the sure road to success. Cleanliness in person and office, good memory and enthusiasm for work, are qualities that should show a high degree of development at the start, and the balance of the training is easy. Without these assets, the little schoolhouse for the training of an assistant is built on the sands, and nothing worth while will be accomplished. Such a girl as we have employed will have the intelligence to know that the dental surgeon who demands such a quality in one is necessarily giving up valuable time whenever he stops to give her instruction. Instruction for weeks is what she wants, and needs, especially the first few days. If she is to be the assistant you have been dreaming of, she must have instructions from you, and if the tight rein which you should be holding on your practice is slackened just now, your wonderful assistant will decline into the gum-chewing, novel-reading office girl. Do not expect that the young woman is going to highly develop those qualities we have already discovered in her if you are not willing to give her some of your time and train her as you would like to have her. Reprimands, sarcastic remarks in the presence of patients, or patronizing ways will not increase her enthusiasm, but sympathy and helpful information, given in the right tone, will repay you many times over. It is a mistake to call Miss Anna Roe, Dental Office Assistant, "Ann;" the position for which we are giving up our time to train her demands more dignity, and the young lady will appreciate it very much if she is always addressed as "Miss Roe."

Training an office assistant to handle the telephone properly, send and receive messages, handle patients over same. and always leave a pleasant impression, is exceedingly difficult in many cases, and it has been the most difficult task for the essayist to develop in an office assistant. All persons are not endowed with a voice suitable for the telephone. Some people seem gruff and harsh over the telephone when in reality they are not.

With some, facial expression in conversation is one-half, and this class of people are sometimes badly misunderstood over the telephone. With so many chances of misinterpretation, unless an assistant has a good, clear and distinct, as well as soft voice, it is well to *develop* these qualities. We are told by the man in charge of this work at the telephone company that it is possible to develop these attributes in the telephone girl, but in the case of a dental assistant, our success has been indifferent. However, whenever the wrong language, sentence, construction, or inflection is used, it is quite necessary that the fault should be corrected at the time, when it is fresh in the minds of both, so that the mistake will not be made again. The young woman should be encouraged to memorize telephone numbers.

STERILIZING.

This is one of the most important duties of the assistant, and to become thoroughly proficient in the work it is deemed quite necessary to spend considerable time in explaining just what a sterile condition is, what necessary qualities a germicide possesses, the distinction between germicide, antiseptics and disinfectants; the necessity of boiling at least five minutes to kill the staphylococcus and streptococcus germs which are the ones we have to contend with; along with the pneumococcus and the micrococci catarrhalis pharatis, etc.; the very great importance of sterilization, by boiling or other means, of instruments for nerve canal work, just before operating, rather than just after, and constantly maintaining that condition during the operation; the value of alcohol on the hands after thorough scrubbing of them—in fact all procedures known to the operator for obtaining cleanliness and asepsis should be invariably impressed upon the assistant's mind in a most sincere and profound manner.

DEVELOPING INITIATIVE.

A stereotyped plodder has no place in the busy dental office; continually waiting for instructions to do this and that, after having been repeatedly told, is not one of the qualities of a successful assistant, and the sooner the young woman is put on her own resources, as it were, after pointing out to her the many pitfalls, the sooner she will develop to such an extent, if she is the right kind, that it will surprise her.

When the assistant is started in her work, she should be impressed with the fact that one of the qualities that will be most appreciated in her is originality; developing new ideas in her particular work, ways of doing each thing easier and in less time; change of arrangement for efficiency; making new plans, and feeling at all times free to make any suggestion she likes for the efficiency of office affairs.

INDIVIDUALITY.

This quality depends largely on our success in developing the initiative, along with responsibility and loyalty. We have discovered a jewel, indeed, when we note that the development of these three qualities has been accomplished in full. Loyalty, we feel, can be easily developed in such a girl as we have employed, but responsibility in an assistant is indeed a quality that is accepted to the doctor's advantage by very few. Developing responsibility is like distinguishing the difference between a mushroom and a toadstool "eat it, and if you live it is a mushroom; if it kills you, it is a toadstood." Light responsibility should be put upon the assistant at first. If she accepts it others can be added, until a point of great efficiency has been reached, or failure is the verdict. There can be no half way in this particular case. The confidential position the assistant occupies makes it necessary that she should witness all contracts and agreements pertaining to your practice. In a quiet and inoffensive way she should be present in the operating room all of the time her duties will permit, and positively must she be present during the administration of anesthetics, and remain with you until the operator feels that it is safe for her to leave. The reasons for this should be impressed upon the assistant's mind early in her training.

ERRANDS.

In sending the assistant on errands of any kind insist upon your instructions being carried out. If what you have ordered through her does not come, send it back, if a dozen times, until your instructions have been fulfilled to the letter. If it develops while on an errand that it will be impossible for her to get just what she is sent for, or that there might be some mistake, she will go to the nearest telephone and consult with you for new instructions, so that the time that would be lost in having her return to the office for instructions could be saved.

PEDDLERS AND AGENTS.

If there is any one thing that exasperates a dental surgeon it is to learn that a peddler or agent has succeeded in getting by the office assistant during office hours. She should be taught to discriminate between the legitimate dental dealers, and agents of insurance, books, mines, and various other schemes. Some little characteristic will develop each time, and these can be pointed out to the young lady so that she can soon distinguish them, and they cannot then get to you with any amount of convincing argument. If the agent is a stranger, and they usually are, the young lady is instructed in all cases to ask the person, "Do you wish to consult the doctor professionally or in a business way?" If they reply "Professionally," she immediately asks, in as courteous a way as possible, "Who has been so kind as to refer you here?" A bit of experience and woman's intuitiveness here will determine whether the doctor is to see the patient or not. If the person replies "Business," he is asked to state his business. If he refuses he should be dismissed with promptness, but if he names the nature of his business, the young lady communicates with the doctor and he determines whether he will see him by appointment out of office hours or not at all. Perhaps fifty per cent. of patients have particular hours that, from choice or convenience and adaptability to daily routine, are greatly favored. Some patients, even the big business man and active society woman, like an hour as early as 8 A. M. Others will *tolerate* the 8 o'clock hour. Some like a certain other hour. Some can come only at 11 or 4. A knowledge of this is encouraged in the young lady assistant, and when it is developed to a high degree—and I may say here that the assistant acquires this attribute quickly—she is often able to mail cards to patients without consulting them, feeling quite certain they will not subject her to the inconvenience of disorganizing her appointment system. Each morning the assistant should be required to copy on a plain white card the day's appointments and hours, together with the different memoranda to remind you of things to be done during the day. This card she places on the cabinet and, as each operation is done, the time of the operation is marked opposite each name on the card by the operator. If by noon the operator has been so busy that he has neglected to attend to the memoranda, the young lady seeing that they are not checked off, knows that it is her duty to remind him and help him attend to them as soon as possible. This card, she knows, contains all of the business of the day, and is the only piece of paper or appointment book that should be handled by the operator during the day, with the exception of the examination chart which contains the exact chart of each patient's mouth in detail. These cards have invariably been made out on the first visit of each patient, and are taken from the special small card index in the cabinet, and have nothing whatever to do with the young lady and her bookkeeping.

After preparing the patient, which I shall describe later, she knows that the chart must be at the right hand of the operator, and accordingly takes from the index the chart for the patient and lays it in a convenient place on the cabinet. Her duties with the patient cease then, until the operator sees fit to call for her services.

Some member of our profession, whose name I cannot now recall, once told me that he had taken his office assistant to witness some operations at a hospital, asking her to point out to him the defects in the system of assisting the surgeon, and, on their return, asked her to explain how those defects could be remedied relative to efficiency. In this way he was enabled to impress upon her mind what he had failed in any other way to do. He put her in the same relative position with the general surgeon's assistant as he himself was with her, and she soon developed the quality of anticipating the movement of the dental surgeon—a requisite she first noticed was necessary in the general surgeon's assistant.

KEEPING UP STOCK.

One very pleasing phase of the helpfulness of an able assistant is her ability to keep up stock so that the operator never has to wait for any materials he might wish for. There is no advantage in buying a great many things in quantities, while in others a much larger percentage is made by quantity rates than a good business man can get for his money. The assistant knows how much material of a certain kind one uses in a certain length of time, and soon determines whether any saving can be accomplished. She has learned by now that you are using only certain qualities and certain brands, and by repeated correction has come to know how to determine values and also to file for instant reference all special quotations on some of the commodities in dental practice.

BOOKKEEPING.

Is taught to the assistant immediately upon assuming her duties. The daily card she copies in the day-book each day, and posts all items.

using a double checking system to avoid mistakes. She furnishes a trial balance each month, which is simple in the bookkeeping for a dental practice, using the bank deposit book and check book to aid in striking a balance. This is the subject for a paper in itself, and time prevents me from going into it more in detail.

She is taught to take the bank-book in for balance the last of each month, so that each voucher can be gone over as soon as possible.

A special index card system is used for notification of patients for prophylaxis, and each card reads: "Mrs. John Doe, 30 days, or 60 days," which indicates the time elapsing between treatments. A treatment card marked in November "30 days" is then put in the December index, so that when the 30 days roll around the young lady sends a notification She keeps this index separate, so that the necessity of attending to it is emphasized in her mind.

RENDERING STATEMENTS AND COLLECTING.

She is taught to start in making up the debtors' list two days before the end of each month. On the last day of the month she submits the list, with the mental information on same that she possesses, and her final instructions are given before mailing statements. As the remittances come in she places a credit opposite the names on the original debtors' list for that month, so that by the 12th she knows just who to write "prodding letters" to. This she does on the 12th, and once more on the 25th. We will treat of these letters later under the head of correspondence.

RATING.

As soon as a new patient has been dismissed after the first consultation, the assistant knows that it is her duty to immediately get a telephone rating of the patient, and request a special typewritten report to follow as soon as possible. If no negative report is furnished, the appointment notification cards are sent out. If the report is negative the patient is informed in some nice way that we cannot accept her as a patient. In only five cases in as many years have we been called upon to tell a patient the whole naked truth.

GETTING THE SHADES.

In all instances where shades are to be produced for artificial substitutes and porcelain inlays, it is advisable to seek the assistant's advice. At first, not knowing the essential underlying colors, her information will be of little value, but after explaining why you select certain colors a few times, or why she is wrong in her judgment, she will soon become much more proficient than you yourself, and you will rely upon her judgment entirely. She is taught the necessity of courtesy in the reception room, of tact in explaining why the doctor is keeping the patient over time, pointing out reading matter, etc., and reassuring the patient that the doctor is anxious to treat her as soon as possible, and will keep her waiting but a very short time. In the dressing room she assists the patient in placing her wraps, etc., and assures her of the safety of her purse and umbrella, and, after preparing the operating room for her, conducts her to same, and prepares for the operation. She is taught to adjust the chair for a comfortable sitting position, adjust the clean linen on the chair and the patient, spray the patient's mouth with a warm antiseptic deodorant, place the chart of the mouth on the cabinet, and inform the operator that the patient is ready.

BANKING.

She is instructed to deposit all checks, see that all items are properly entered in the bank-book and check-book, and have ready all checks for his signature; see that the book is balanced on the last of each month, etc.

CORRESPONDENCE.

During the first few months the assistant should be required to copy all business letters sent out. In this way she will familiarize herself with your style and in a very short time be able to write a letter that will invariably express your ideas. In writing to delinquents, two form letters are all that are necessary, and the assistant soon memorizes them for good.

In making appointments the assistant soon learns during what hours you do your hardest work; she is taught your favorite hour for examination, consultation, and learns that a few minutes is all that is necessary in some cases, and she advises that class of patients to come in during consultation hours. She learns from you how many hours the patient will need, and governs her actions on this matter accordingly. If Mrs. So-and-So has 11 A. M. on a Friday she will determine from the lady how often she can come at this hour, and arrangements are made satisfactorily to all concerned.

MAKING AMALGAM MODELS.

It has been the policy of the essayist to have impressions of all kinds packed or flowed immediately. The assistant is always present with the cold air blast and ice pack in obtaining impressions, and is taught to take same to the laboratory and proceed immediately with the different steps in procuring a model. In this way everything is cleaned up.

The same is applied to wax inlay matrices. They are invested immediately, the young lady having been taught in detail each successive stage. She, as well as I, have learned by experience that it is a better way. During the first few weeks that our young lady is with us she is given two or three catalogs to study, and is then asked for instruments by name. She realizes that she is being quizzed, and makes every effort to get it without further consulting us. If she does not remember, she is taught to refer to the illustrated catalog, and before long knows the names of all of the instruments and will assist you at the chair, especially in pyorrhea work. If you learn the numbers of the instruments and take the trouble to call for them by number, she will pick it up quickly, and your instrument will be sure of sterilization during operations.

In review, it would seem that we have made it necessary for our office assistant to possess, or have developed, an exceedingly great number of attributes, but I know of many men who will tell you that they know of assistants who possess many more than have been enumerated here. The essayist's experience is not overdrawn in this paper, and we feel that much more can be accomplished with an office assistant than has been given here. Only neglect or inattention to such details as are set forth in this article can prevent one from eventually obtaining the perfect office assistant. Versatility will eventually become her predominant characteristic. Many operators will say, "Oh, I can't do that, I can't take the time," etc. Just remember, my friends, that "the man who thinks he can't is usually right." This we do know, that a carefully trained and well-paid assistant will mean hundreds of dollars' assets to any busy operator, and one way to become a very busy and well-paid operator is to have a very busy and well-paid lady office assistant.

"BACHELOR OF MEDICINE"- M. B.

BY WILLIAM CUMMINGS FISHER, D.D.S., NEW YORK CITY

THAT SOME RADICAL CHANGE—readjustment and improvement in the curriculum of study—leading to and terminating in the M. D. degree—must be effected, is seen in the dicussions which have for some time now engaged the attention of the entire medical world.

We have the Surgeons of North America, in their recent Clinical Congress held in New York, taking up the question of establishing a minimum educational and practical training of those who practice surgery. A recommendation was made that a supplementary degree to that of medicine should be established—in other words, a granting of a post-graduate degree similar to the F. R. C. S. of Great Britain; thus implying that the training and education is inadequate and does not produce the necessary training to qualify a graduate to practice surgery. Again we find this same complaint and also somewhat similar suggestions from the gentlemen practicing the various specialties of medicine, such as rhinology, otology, ophthalmology, gynecology, etc.

Only recently an ex-president of the American Medical Association in an open letter to the public press denounced the fee-splitting medical practitioner as a Misbranded Medical Specialist. It is well enough for this gentleman to call them misbranded medical specialists, but they are all men bearing the degree of M. D. and possess the qualified rights to practice any and all of the varied branches of the healing art. They are the result of an inefficient curriculum leading to a degree bestowing unlimited privileges of practice.

What assurance has the public today that the medical specialist they consult is thoroughly qualified to practice that specialty in which he classifies himself? He possesses only a general degree—that of M. D. What, if any, further training he has had the public is absolutely unable to learn, or at least, it has only hear-say evidence.

The course of study leading to the M. D. degree is wholly inadequate to train one to intelligently practice anything more than a very small part of that science which the degree represents. What is the result? His diploma and license which permit him to practice in any or all departments of medical work defend and support him in his many failures for which he and those who launch him upon the public should be censured. The science of medicine has outgrown its curriculum. The progress in the several sciences which goes to make up this curriculum and the amount of data pertaining to them has become so vast that no human mind can grasp more than a small part of this ever-growing field of knowledge. So I wish to suggest the curtailment of some portions of these sciences, amplifying others, which are needed in the practice of the several special branches of the healing art.

Too much stress, I think, in the past, has been laid on the obtaining of the B. A. and B. S. degree, before beginning the study of medicine. Surely sufficient Latin, French, chemistry, mathematics, etc., can be obtained in the preparatory schools and if these preliminaries are all that is necessary to enter a student on his course of study in a school of arts or sciences, so should it admit him to the study, not Doctor of Medicine—but, this new degree which I have proposed, viz., Bachelor of Medicine.

The preliminary requirements have too often been unreasonable and too often violated by falling back on those words "equivalent to so and so," admitting more trash to schools than would be possible if we had a *preparatory school diploma* as a necessary entrance requirement. The omission of the "equivalent" clause would probably shut out a few good students, but that would be better than the admission of the great amount of trash that now obtains admission under the "equivalent" clause. If there be any subject in the American college course leading to the Bachelor's degree that is so very essential to the medical or dental student's training, and he has not received in his preliminary studies sufficient instruction therein, it would be an easy matter to include that in his first two years' medical curriculum and allow it to precede, if necessary, the primary branches. Do not raise your entrance requirements to your professional schools so high that a man must spend four years or more of his life in unnecessary study that should be applied to those branches immediately necessary to equipping him for his life work.

Dr. Arthur Dean Bevan, of Chicago, recently said: "I want to criticise one requirement which has been adopted at Harvard, namely, that of a Bachelor's degree for admission to the Medical School. There is no fair reason why the anomalous American college course should be sandwiched in between the secondary school and the Medical Department of the University. Life is too short to compel the waste of two or more years in this way. If a Bachelor's degree is required and a hospital interneship added, the average age of the class at graduation will be 28 or 29 years, too late an age for a man to begin to make a living.'' ``This is a very serious question and I feel sure from the comparative studies that I have made that it is a mistake to make a bachelor degree requirement.'' Understand, Doctor Bevan at all times means the Collegiate Bachelor Degree of Arts or Science when he refers to the Bachelor degree—I would not have you confuse it with the subject of my paper.

President A. Lawrence Lowell, of Harvard, recently said: ``It is neither well for the man nor for his community that he be forced to wait until he is 28 or more before he can think of marriage. It is far better that he enter college early in life, close his work in the regular time, and then launch his efforts in the world while he is still young. It is very certain that the younger a man makes his beginning the better student he is.''

The pursuit of a course of study for two years leading to the degree of Bachelor of Medicine should cover what is now termed ``The Primaries.'' There would be no necessity to change the curriculum for these first two years, except as just stated, and a diploma from a standard four-year high school or preparatory school is evidence of sufficient preliminary education to warrant the student pursuing his studies to the degree of M. B., Bachelor of Medicine.

I would make it compulsory that the degree of M. B. be obtained by any and all who would continue their studies in any of the schools of medicine or dentistry. In fact, anyone applying to his state for a license to practice, in any manner whatever, any scientific treatment upon the human body, should possess the M. B. (Bachelor of Medicine) degree which in itself would be evidence of the possession of certain necessary knowledge of the human body, and elementary medicine.

Further, the granting of this degree of Bachelor of Medicine at the expiration of two years would make possible a weeding out of much undesirable material; men who find themselves ill adapted to their chosen calling, but who, under the present conditions, hang on for two years more, either through pride at not wishing it known that they could not finish, or who, through economic reasons, don't feel able to lose two years' study without something to show for it. Many of these classes hold on, and after four, five or six years ``land'' their degree of Doctor of Medicine and are then enough puffed up by their conceit to make a try at practice, thus furnishing us with the ``dead-wood,'' ``the back-slider'' and the ``fee-splitting pseudo specialist.'' Much of this could have been avoided had those men had a point in their curriculum where they could have honorably left the study of medicine for another more suitable calling in life.

Those students who wish to continue their studies in medicine could do so, paying particular attention to the specialty they intend to practice. Many of the specialties could easily and with profit be grouped in similar curriculi. The student could take his Doctor's degree in the specialty he intended to practice and be licensed by his state to practice that specialty *only.* This would clear the field of the uneducated, ill-prepared and unscrupulous specialist of all branches.

The obtaining, first, of the Bachelor of Medicine degree, would be of material benefit, also to the dental practitioner as well as the other specialists of medicine, as it would be a certificate of a certain fundamental elementary knowledge of medicine, which so many graduates of dental schools lack.

In some European countries it is now necessary for a practitioner of dentistry to be a graduate of medicine and Virginia has decided to require it. While this may not appear undesirable, yet it is very doubtful if prolonging the dental course to five or six years and making it supplementary to the Doctor of Medicine degree will bring to the specialty of dentistry sufficient men to fill the demands of practice. Too many, with Virginia's plan, will stop short with the Medical degree and practice general medicine. While by some such plan as I have outlined, a student, after having obtained his Bachelor of Medicine degree, could pursue a special curriculum leading to the practice of Stomatology and Dental Surgery, but, obtaining the degree of Doctor of Medicine and be licensed by his state to practice his specialty *only.* This, of course, could be left to be worked out later and whether or not it was effected as I have outlined, it could not detract in any manner from the benefits to be derived from the establishment of the degree of Bachelor of Medicine.

373 Fifth Avenue.

REMOVABLE ANCHOR BRIDGE*

BY DR. CARL KNOCKE, CHICAGO, ILL.

Most methods adopted up to the present, for removable dentures, have in a way failed, because of making no provision for the renewal of worn-out parts, or lost parts. The Kelly principle is the one most widely in use.

The Knocke method is based on a principle of having the force that in the finished piece has a tendency to displace the denture, exert, or expend itself in a direction, as concerns the teeth upon which the denture depends, least liable to result in loosening and destroying the natural tooth or root. There is a small amount of lost motion allowed for, to space as much as possible, the natural abutment.

For holding the parts after assembling, use White's clasp metal wire or bars, for it is impossible to perfectly solder platinoiridium metal.

An upper denture in the mouth of a patient, constructed by the clinician, was examined by the visitors. It consisted of two parts: the incisors and canines, snapping to place as one piece, after which the bicuspids and molars, constituting the second removable denture, were snapped to position.

The whole constituted a novel and apparently effective device.

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*Clinic at Ohio State Dental Society, December, 1913.

A DEVICE FOR FINISHING RUBBER PLATES

BY C. J. PALMER, D.D.S., APPLETON, WIS.

Being unable to procure from any of the Dental Supply Houses any device suitable for finishing rubber plates, I have devised the following:

A large-sized felt cone at least ¾ inch in diameter, or larger, is suitable; saw a slit lengthwise to receive sandpaper the same length as cone, place a wire ligature through and close slit at large end See Fig. 1.

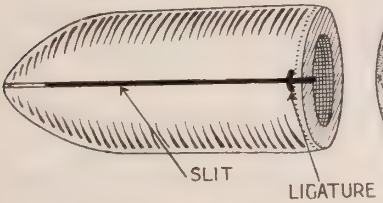

Fig. 1

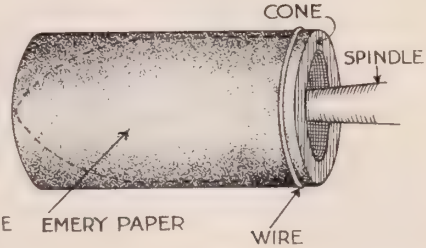

Fig. 2

Insert paper and wind around cone and fasten with a spring made from a spring used in curtain poles, which is superior to rubber bands. See Fig. 2.

BORATED OXYGEN TREATMENT FOR PYORRHEA ALVEOLARIS*

BY DR. F. H. SKINNER, CHICAGO, ILL.

The Dunlop vapor is very beneficial in reducing any form of inflammation. A great many people have congested areas high up in the tissues of the alveolar process, even though the gums appear apparently healthy at the gingival margin. These red or cyanotic areas indicate osteitis. They can be reached and the inflammation cured with the Dunlop vapor. In this way a good many cases of pyorrhea can be prevented from developing. We find these inflamed areas in all mouths which have had an abscess, gingivitis or pyorrhea. This indicates that there is not good circulation in the process, and even though thorough instrumentation is carried out, satisfactory results are not always obtainable.

By establishing good circulation and building up the tissues, before doing thorough instrumentation, much less instrumentation is necessary, and the tissues are not in as hypersensitive a condition, so the work is much less painful to the patient and the response to our treatment is much more rapid, and where the pericemental membrane is not dead, we get a re-attachment of the tissues without the bad recession which we have where instrumentation alone is used. These results can be obtained by the proper use of Dr. Dunlop's borated oxygen.

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*Clinic at Ohio State Dental Society, December, 1913.

To give a treatment, upon opening a valve the gas passes through a so-called carburetor, where it is further charged with the ethyl borate. Ethyl borate is a supersaturated aqueous solution of boracic acid to which about 4% alcohol and a little thymol and gaultheria are added. When the gas is allowed to escape through a large nozzle, it should carry a spray with it, which leaves a sediment upon anything with which it comes in contact. This is used for cleaning out pus pockets. If the adjustment is right, the mixture, when forced through a blunt hypodermic needle, is volatilized and comes out as a gas, with no moisture or visible sediment. This gas is what is used in the treatment of pathological conditions.

The removal of all deposits is usually necessary in this treatment, but in my experience the results have been much more rapid and satisfactory after the use of the Dunlop vapor for from two to four weeks, i. e., the operation of removing deposits is less painful to the patient, takes less time to perform, and the tissues attach themselves much nearer to the necks of the teeth. The gas enters the tissues through the little ducts or glands which line the inner wall of the gingivus and can be found wherever there is any inflammation, either deep-seated or local, but it cannot be forced into healthy tissues.

The vapor can be seen as it flashes up into the soft tissues, or it will cause the little ducts to stand out like whip-cords when it passes up into bony tissue. A hyperemia is always visible, and the patient feels a glow indicating an increase in the circulation. Soreness leaves the tissues almost immediately and unless there is a constant infection or irritation will not return.

REPORT OF THE EXAMINATION OF THE SCHOOL CHILDREN'S TEETH OF PARKERSBURG, W.VA.*

BY DR. I. W. HUTCHINSON

We have had two examinations of the children's teeth in the public schools of Parkersburg and we find that the results are very gratifying, as our efforts have been appreciated by the public in their response and co-operation of this great work. Superintendents of the schools have heartily aided us in the work, teachers have been a great help in co-operating and aiding us in every way possible, the principals of the schools have been very courteous and firm in handling the work. Hence we see a great change in the public generally, as to the care of the teeth and keeping the mouth clean. We asked each one examined if she or he used the tooth brush and impressed upon them the necessity of keeping the mouth clean. The last examination is as follows:

Six hundred thirty-six need attention.

Ten per cent. perfect.

Thirty per cent. improvement over last year.

Good accomplished, "unmeasurable."

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*Given at W. Va. State Dental Society, 1913.

PORCELAIN JACKET CROWNS*

BY DR. A. E. SCHNEIDER, DENTAL CERAMIST, CHICAGO, ILL.

This practical table clinic contained a series of mounted specimens, showing the weaknesses of all types of crowns—porcelain and gold, dowel, banded and bandless.

The greatest fault noticed in all was the point of union of crown and material, invariably it showed an unclean area.

Then models in a series of twenty-five mounted specimens were shown, giving the exact technic of building a porcelain jacket crown, beginning with the importance of proper tooth preparation, followed by the proper technic for taking a perfect impression with modeling compound, followed by an accurate mush bite impression, then showing the steps necessary in the making of a solderless matrix of absolute rigidity and which conforms perfectly to the tooth surface.

Next was shown the models, which demonstrated the correct manner of color laying and porcelain building, which showed the models in biscuited forms, as well as the completely fused crown.

These crowns, if the technic as given is followed, show the exactness with which a root end can be fitted.

The completed work shows better than any other type of crown, the correct confirmation, the improved esthetic effect, that we are trying to get in our improved dental procedures toward truly prophylactic dentistry.

Taking all points into consideration, it is easily seen why we do concede to the porcelain jacket crown, the premier, the ideal of all types of crowns.

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*Report of clinic at Ohio State Dental Society, 1913.

HIGH PRESSURE ANESTHESIA*

BY W. T. JACKMAN, CLEVELAND, OHIO

This was a demonstration of pressure method with the Myers syringe. The point emphasized was the need of proceeding slowly and carefully at first, applying the pressure lightly, at first, to avoid suddenly causing pain by too great violence in injecting. It is to be regretted that this method of painless preparation for filling, as well as for pulp extirpation and other minor purposes, was not more generously used, dwelling on its efficiency, if used as directed.

The operation of inducing perfect anesthesia upon a patient—a visiting dentist—was followed by wholly painless preparation of a cavity in a lower molar, for filling.

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*Clinic at Ohio State Dental Society, 1913.

SOME PROPERTIES OF VULCANIZABLE RUBBER AND HOW TO CONTROL THEM*

BY GEORGE H. WILSON, CLEVELAND, OHIO

This clinic called attention to the expanding and contracting, and poor conducting properties of rubber. It demonstrated that the porosity of vulcanite is entirely dependent upon these properties. It called attention to the modern theory of chemical combination of caoutchouc (C_{10} H_{16}) and sulphur (C_{10} H_{16} S_2=32% of combined sulphur). That hydrogen-sulphide has nothing to do with the formation of vulcanite, its presence is an evidence that something has gone wrong. The clinic demonstrated that the danger of imperfect vulcanization lies in applying heat too rapidly between 200° and 250° F. The method of vulcanization recommended consists of vulcanizing in steam (above the water in the vulcanizer), under spring pressure (either Donham clamp, or Snow springs on the bolts) and one hour of time to heat the rubber to 300° F. and the heat to be maintained at this temperature the length of time each operator finds his vulcanizing conditions require, which will be from one to two hours.

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*Clinic at Ohio State Dental Society, December, 1913.

CAVITY PREPARATION FOR THE GOLD INLAY*

BY J. V. CONZETT, D.D.S., DUBUQUE, IOWA

The fundamental principles of a cavity preparation are the same no matter what the material chosen for the filling of the cavity.

We must observe the principles of extension for prevention, the making of the proper resistance and retention forms, the proper convenience must be obtained, and the careful regard for the cavo-surface angle that the enamel rods be protected.

In the preparation of a cavity for the reception of an inlay all of these principles must be as carefully observed as in the making of a gold filling.

We have been told that there are so many failures with the gold inlay that numberless men are deserting it and going back to the filling, and as I have observed the slip-shod methods of cavity preparation that men have been using in the making of their cavities for the inlay, I am not surprised at the failures; in fact, they are simply the fulfillment of a prophecy that I made along that line several years ago; but, let me say parenthetically, I have never been so much impressed with the great value of the gold inlay, as a saver of the teeth, as I am today. It is the best method that has ever been given to the dental profession for the restoration of lost tooth structure.

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*Clinic at Ohio State Dental Society, December, 1913.

In the making of the cavity we must carry all of the lines of the cavity into self-cleansing territory. The walls of the cavity must be as nearly parallel as it is possible to make them, and in proportion as we depart from such parallelism do we weaken the retention of the inlay.

The resistance form is best obtained by making the seats of the cavity absolutely flat, and again, in proportion to the departure from this principle will be the weakness to the resistance to the thrusts that will fall upon the finished inlay.

But the principle emphasis that I wish to place upon cavity preparation at this time is the proper preparation of the cavo-surface angle. We have been told to make a butt-joint and in my opinion that is absolutely wrong for three reasons:

We know that enamel is one of the strongest tissues in the body if its continuity is unbroken, but once it is deprived of the support of its neighboring rods it becomes the weakest of tissues, for the unsupported rods will, upon the slightest application of force in the right direction, fall into the ditch made by the displacement of the missing rods, therefore, in the making of a filling it is necessary for us so to shape the cavity that these frail rods may be protected. The best way to protect them is to bevel the margin of the cavity, and in so doing we answer the other objections also, for the beveling of the margin of the cavity makes a flange upon the inlay as it is cast, and thus provides a means of burnishing the gold down to the tooth, which cannot be done with the butt-joint.

The third objection to the butt is the fact that it allows a thin layer of cement between the inlay and tooth to be exposed to the fluids of the mouth, and the constant pounding of mastication has a tendency to break up this thin plate of cement and cause it to fall out and leave a vulnerable spot for the recurrence of caries.

AN EASY METHOD OF INTRODUCING TREATMENT*

BY DR. W. J. BOYDSTON, FAIRMONT, W.VA.

The idea is the placing of cotton, with treatment, in root canals. It is done by means of a triangular broach, which is annealed and, consequently, very soft and will follow the canal easily. By wrapping a small thread of cotton tightly around the broach you can place the medicament to the desired place in the root canal, and by giving the broach a twisting motion can relieve the cotton and leave it at the place desired. This is the easiest and most satisfactory method of placing treatment in root canals.

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*Clinic at West Virginia State Dental Society, 1913.

ORAL ASSIMILATION*

BY P. A. GOULD, GIBSONBURG, OHIO

THE KIND LETTER RECEIVED from your secretary asked for a paper and referred to one written by myself on "Gold Crown and Removable Bridge Work" as a subject. The time allowed to one who happened to be very busy when your kind invitation was received and acknowledged, was short, so do not look for a very elaborate or a very long paper.

My remarks will review a few things that have been acknowledged, but never, in the writer's judgment, been given the consideration they should have in the practice of dentistry, and the medical profession, in the relation that should exist between them.

There are innumerable conditions of the physical body that owe their origin to the condition of the oral cavity and the assimilation that takes place there.

The purpose of the paper above referred to on "Gold Crown and Removable Bridge Work" is to show ways to produce normal conditions in what are termed wrecked mouths, and at the same time correct and avoid conditions that produce oral sepsis. The writer thinks it will be well to consider a few things in regard to oral assimilation, before giving the clinic that is to be considered this evening.

Attention at the present day is turned toward the subject called "Fletcherizing" or the thorough mastication of all food taken into the mouth. The good health which follows such practice is largely attributed to the advantage gained in the digestion of the food after it leaves the mouth and passes down the oesophagus into the stomach, and not much credit is given for any benefit derived from the food until it reaches the stomach.

No thought is taken or credit given for the benefit that is derived from the food that is eaten slowly, and by the process of mastication the harder parts of the food divided, that the more delicate and nutritious substance they contain may be set free to be absorbed and taken up through the mucous membrane of the mouth and carried directly into the circulation.

Dentists, above all professional men, should consider this subject of great importance to their profession: That it is very important that so-called wrecked mouths be restored to as nearly normal conditions as possible; that the mouth be free from all irritation caused by either uncleanliness, decay of teeth improperly filled, or anything that will cause sepsis or a local foci of infection.

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*Read before the Summit County (Ohio) Dental Society, 1913.

Bacteria in the mouth may not always be absorbed there, but their effect on the more delicate and most nutritious substances of the food may be such as to prevent them from being assimilated in what would naturally have been the orderly way. One thing that is not orderly will continue to increase disorders; the whole trouble which may follow could have been prevented by removing the cause of the first disorder.

The dentist must pay close attention to the manner in which he uses such drugs as formaldehyde, arsenic, cocain and many others.

It is here in the mouth that the first assimilation takes place, those parts of the food that are sweet to the taste, essential oil, and spirits are immediately received into the veins and borne directly into the circulation. Food which is hard, in which there is bitterness and foulness, is more harshly treated, and is cast down through the oesophagus into the stomach. What is still harder, and more foul, and worthless, is thrust into the intestines, and at length into the colon and at last is cast out and becomes excrement. It is the purest and best substances in the food for the needs of the body that are assimilated in the mouth, and those which are first to affect a change in its condition.

We may illustrate this to show the quick response to oral assimilation, in a case of the toxic effect of cocain: A little whiskey diluted with hot water held in the mouth will produce instant relief, while if swallowed it will often produce nausea and vomiting instead of the desired results.

It is quite necessary of food which is taken up into the mouth that the harder parts be well broken and separated by the teeth to expose all that is in it, so that the more delicate nutritious substances it contains will be set free and easily absorbed in the mouth.

The longer food is retained in the mouth the greater the assimilation of the food that takes place there. This is well illustrated in what some of our good writers have to say of the benefits derived from the chewing of liquids, which is made the subject of jest by some of the medical profession.

It becomes the work of the dentist at times to crush careless principles of judgment and defend a few truths that experience of his profession have proven true and are a benefit to mankind, even though they may be contrary to what has been considered good professional practice.

FIRST AID TO PAINLESS DENTISTRY

A certain dentist in Boston, who is very much up to date, has lately added a player-piano to his office equipment. He says that by barring "hesitation" selections he is able to announce a most gratifying increase in business since he began to yank and fill teeth to music. The patients are better natured in the chair, and one old lady so far forgot her misery that she paused on departing to thank the doctor heartily for the "most excellent musical entertainment."

"MEN ARE KNOWN BY THE TEETH THEY KEEP."*

BY OSCAR DOWLING, M.D.

PRESIDENT STATE BOARD OF HEALTH, NEW ORLEANS, LA.

DOCTOR WOODS HUTCHINSON SAYS: "Men are known by the teeth they keep," which is not an unphilosophical means of classification. Almost since time was, the self-respecting horse trader examined the teeth of his prospective purchase and not alone to determine the age. Teeth, whether of horses or men, reveal more than one characteristic.

The application of this proverb to men is due to the wider knowledge of disease. Formerly clothes, bedding, air, were thought to be the medium which spread infection; now it is understood that smallpox, measles, scarlet fever, meningitis, will not become epidemic if close contact with human carriers is prevented.

Infection largely, almost entirely, enters through the mouth and nose. Once having entered, it is in the crevices and corners that the bacteria multiply. If the germs multiply in cavities, they are carried by food into the stomach and by the saliva to the outside, thus spreading infection.

Often, the indigestion which is charged up to food is caused by one of our many hygienic errors of omission—imperfect mastication. We begrudge the time to eat even when teeth are perfect. Much less will we take the trouble to do a good job when the ivories are in a state of bad repair. Food poorly broken up is sure to cause trouble, immediate or remote. A man's indigestion is, in a measure, at least, determined by the teeth he keeps. These very simple propositions point out two of the most common ways in which physical ills are promoted, but they do not, as important as they are, imply all that is to be said of teeth and their relation to human economy.

We are in debt to zoology and biology for many facts not known to our forefathers. The application of these truths is just beginning to be understood. Since the days of Darwin and Spencer, it has become increasingly apparent that a new scale on the ear of a lizard may imply a new scheme of the universe; likewise, the preservation of a molar from generation to generation may produce a new type. Into our philosophy there has come an element of humility and expectancy; the opposite of finality. It is drawing us to an intelligent conception that the seemingly impossible "very hairs of your head are all numbered," may be possible. Widening thought reveals a new perspective as to the individual and universe.

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*Read before the Louisiana State Dental Society, 1913.

The connection with our subject is for increasing bodily perfection; there must be an increasingly perfect basis. No part of the body may be neglected. To save the first permanent molar; head off disfiguration and abnormal development; maintain healthy conditions in the mouth of the child, is to lay a foundation in the individual life for greater usefulness and greater opportunity for achievement. It is part of the philosophy of prevention.

Clearly, the initiative must be with the child. Investigations made in various schools to discover the physical status of the pupils show that appalling conditions exist. The reports form an unanswerable arraignment of our boast that we care for our children as a civilized people should. Many of these inspections have been carried on by men and women trained for the work. Their records are reliable. In some instances the examinations have been superficial and conclusions deduced which led thinking people to doubt the reports of all. Manifestly, it is ill-timed and unwise to make sweeping generalizations for a state or section based on the investigations among a few, limited to a small area.

You are familiar, doubtless, with the figures. From 50 to 90 per cent. of the children examined were found with oral defects. Taking the lowest estimate, the need of immediate action is apparent, both for present effort and for ultimate improvement. To you, and others who understand, mouth conditions found almost universal, seem unpardonable. It is somewhat shocking that mothers who insist on clean faces and hands to the point of the proverb, are without conscience when it comes to the care of the teeth. But in this, as in other violations of the health Decalogue, it must be remembered that the commandments are a late revelation and there are many who do not know.

Some one has said knowledge permeates from the top down. History bears out the statement. From the laboratory of the scientist, the infinite pains of the mathematician, the discovery of the inventor, the deductions of the philosopher, the table of the statistician, knowledge radiates. The man characterized in his own time as an idealist, a visionary, a dreamer, an enthusiast, becomes the authority of the next generation. Sometimes he may live to see his thought embodied in the laws of his time; possibly, concrete in the habits of the people.

In the Middle Ages, the universities led; in our own day, even in the most practical affairs, the same is true. It is for this reason that the professional man has to assume leadership. He realizes because of wider knowledge of both immediate and ultimate effect that he must, from altruistic motives and those of self-respect, attempt to lead, or force, others who are unaware of the vital importance of these unhygienic conditions.

That the self-imposed task of teaching conservation of health as a vital element in child welfare is almost wholly a thankless one, goes without saying. Physicians and dentists insisting upon medical and dental inspection of school children and remedies have been called advertisers, commercial-minded and other names which imply that their efforts were considered selfish, a means of increasing the revenue of the office. The attitude of the public in general is one of the obstinate conditions which must be overcome. Work only, effective and productive, will avail. In many places volunteer services have proved of such value that conviction has been wrought in the minds of the authorities and systematized work has resulted.

In one small city where there are six schools, the dental inspector makes a visit one morning each week. The children are sent in classes of five to a room arranged for inspection purposes. Each child is examined apart from the others to avoid any embarrassment. Time is taken to impress upon the individual pupil the oral condition and the necessity for care and for treatment if the latter should be necessary. A complete record is made and notification blanks sent to parents. Instruction is given the different grades emphasizing the salient points.

Equipment for this work is not extensive. As given for several schools by one inspector it consists of one dozen mouth mirrors, one-half dozen explorers, two glass containers, facilities for washing hands, a small quantity of formaldehyde and antiseptic solutions.

The most important feature of the system is a free clinic. In Newark, New Jersey, in 1912, 3,480 patients under 18 years were treated and 321 above that age. In all, 19,578 treatments, etc., were given, an average of about five to a patient. Data relating to the cost of these free clinics is meager. In those I have happened to note, it ranges from 19 to 34 cents per the individual treated. In German cities, the cost is less than in this country in cities where the work has been introduced.

Some few experiments prove conclusively the value of this inspection and treatment in terms other than those of physical welfare. One is recorded in a popular film which will be shown tonight. In fourteen months' time from dental attention only, the mental powers of a class of twenty-seven children, between the ages of 12 and 14, were increased 99.8 per cent. This experiment opens a perspective as to results which might be obtained if care could be given from school age up—better from birth up.

It can not be hoped that the dental profession or the physicians and dentists by united efforts can overcome these conditions. For success the local board of health and school board, together with state health and school boards, must combine to inaugurate a satisfactory system and this depends upon the children's parents who are the real owners and authorities of the schools.

One of the most perplexing of the questions connected with dental work for children is how to do it satisfactorily under present conditions. The dentist seldom sees "Johnny" until he appears, under protest, with a howling toothache. If he has not heard of the dentist as a terror, his imagination has run riot on the subject. The impatient, or tearful parent thinks the pain should be stopped at once or the tooth pulled by magic.

Treatment is too slow. The tooth must be pulled some time, the quicker the better. To work with children in their normal condition is difficult for those not specially trained: much more difficult, of course, when the child is suffering pain, or in a state of revolt or terror. Many dentists and physicians do not wish to make experiments: they prefer to work with adults.

In addition, it is generally thought the charges for the care of children's teeth should be less; if there is any differentiation, they should be higher. Only proper appreciation of the part perfect oral conditions play in the mental and physical development of the child will solve this problem. When they fully comprehend, parents will be glad to pay for expert service and the demand will be an inspiration to train for special fitness for the work. The compensation, aside from that arising from all work well done, comes in the friendly relationship established between the patient and doctor. It means a great deal more than many professional men realize. The friendship and confidence of a child is well worth while.

Only a few years ago the health officer would not have thought of attending a meeting of social workers, prison reformers, insurance men, police supervisors, fire chiefs, dentists, or pharmacists, nor would he have been invited. But, appreciation of the idea of social co-operation in all efforts that pertain to public welfare have brought together professional men and others interested in social progress. As yet, the masses of the people do not understand this phase of present development, much less can they be expected to understand the details that pertain to the individual welfare. Indeed, there are many members of these callings who are not wholly in sympathy with either the idea of social union for the common good, or wholly convinced as to many of the specific truths developed.

But, for the thoughtful, sufficient demonstrations of the truths of hygiene have been made to bring conviction as to the need for methods different from those of the past. The interdependence of all portions of the human body, no matter how apparently insignificant; the important relation that some bear to physical perfection; the wisdom of conservation of certain vital elements; and economy of prevention of disease, stand out clearly in all health work as fundamental. With the consciousness of the extent of possibilities for human welfare offered by the application of these principles, there comes also the sense of obligation to society. The professional man's social self seeks co-operation for civic good. He realizes civic need; he must harken to the call.

At present, in every field of social endeavor, preparation of soil and sowing of seed is imperative; the laborers are few; the immediate reward not great; but, "yet a little while and the time of the harvest will come."

RADIOLOGY AS AN AID TO THE DENTAL SURGEON*

BY S. C. BARROW, M.D., SHREVEPORT, LOUISIANA

WHEN ROENTGEN MADE KNOWN, in 1895, his discovery of that form of ether vibration called by him the X-ray, none of the branches of the medical profession realized how the later use of this agent would facilitate and simplify the diagnosis of the many conditions in which it is routinely used today as a primary procedure, to say nothing of the host of others in which it is applied as a confirmatory test of other evidence.

There is no specialty in the practice of medicine, and I consider dentistry a very important specialty, which does not at some time find need of the X-ray as a method of diagnosis.

While surgery has monopolized its uses to a great extent, we find the general practitioner, the eye, ear, nose and throat specialist, the gastro-enterologist, the genito-urinary surgeon, the orthopedic surgeon as well as the dental surgeon and others invoking its aid in a diagnostic way.

Referring to Dr. Kassibian's excellent work on radiology we find an account of the first skiagraph of the teeth which was made and exhibited February, 1896, in Germany.

In April, 1896, Walkorf showed at a German Congress a collection of dental radiographs. In June, 1896, Dr. W. J. Morton, of New York, contributed an article to *Dental Cosmos* entitled "X-rays in Dentistry." Thus you see the dental profession was among the first to take advantage of radiography, as the Ray was only discovered in 1895.

In setting forth some of the principal uses of the Ray in dental diagnosis, I would emphasize the fact that it should be used as in other branches of medicine as an aid to other methods and a confirmatory test of clinical symptoms.

While it is true that many dental conditions may be determined by a correctly made and interpreted radiograph alone, the clinical symptoms must be held in mind and compared with the X-ray findings in order to reach the most accurate conclusions. The dentist or surgeon who has little clinical knowledge and training is the one we usually find so prone to contradict the radiological findings and criticise unfavorably the uses of the X-ray. In my experience, the thorough clinician and practical physician is the one most appreciative of the radiologist, while the theorist and pseudo-scientist is usually the critic.

An X-ray picture is simply a shadowgraph, the varying shades being strictly dependent on the relative density of the tissues through which the rays pass before striking the plate or film. If this fact is held clearly in mind we find little trouble in reading an X-ray plate, and it serves as a guide in determining whether a given suspected condition is suitable for X-ray investigation.

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*Read before the Louisiana State Dental Society, 1913.

The dentist must understand the pathology of the case to appreciate the X-ray findings and the radiographer must understand the pathology to correctly interpret the plate. For instance, a clear white spot on the negative would correspond to a metallic filling, while a dark area would likely mean a cavity; in other words, the former means increased density, the latter decreased density or absence of tissue. The tissues entering into the formation of the dental field, owing to their difference in density, constitute ideal condition for radiography.

The maxillary bone is seen on the plate as a uniformly white shadow, the outlines being well formed; as we approach the tooth we note a small area immediately surrounding the tooth somewhat darker than the bone shadow; this corresponds to the alveolar process, being bone of less density than that forming the main body of the jaw. Next, we see the outline of the tooth, which is quite white and, passing through the center, a dark streak, corresponding to the nerve canal. Thus you see we have alternately light and dark areas which correspond with the density of the tissue through which the Ray passed on its way to the plate. This is the normal and any undue departure from this arrangement of shadows means a pathological condition. For instance, if our plate shows the maxillary shadow normally white with a circumscribed dark area in the white field, we know at once that this means decreased density at this point, and being circumscribed we naturally think of an abscess cavity or a bone cyst. The edges of an abscess being, as a rule, jagged and irregular, will differentiate it from a cyst, which is usually clean-cut and regular in outline.

A fracture into or through the maxillary bone is easily seen on a properly-made plate, a dark streak in the white field corresponding to the fracture line when the edges are separated, or an irregular outline of the bone edges when the fragments are overlapping.

Bone necrosis, especially when diffuse, is some times hard to identify unless we have the entire jaw on the plate, or the corresponding area of the opposite side on a film taken under the same conditions and developed to the same extent. However, necrotic bone being much less dense than healthy bone, the rays penetrate more easily and as a result the shadows in the necrotic area show up darker than over healthy tissue.

Instead of the uniform dark streak lying between tooth and bone, indicating normal alveolar process, we find at times dark areas at apex of tooth, the favorite site of an abscess, or possibly nearer the margin of maxillary shadow as in pyorrheal pockets.

Coming now to an exploration of the teeth proper, it has been found that the radiograph will clear up many of the obscure conditions which confront the dentist in his daily experience. Abnormalities of all kinds, such as unerupted teeth and their position with relation to the other teeth, the absence of a tooth or normal pulp where one should exist; or again, the existence of supernumerary teeth are common conditions easily disclosed by the X-ray plate.

A softening and absorption of the tooth root, or decayed areas above the gum margin, are easy of demonstration on the small dental film. Pulp stones show as opaque bodies in the canal and are circumscribed and dense.

The condition of root fillings, whether interrupted or extending to apex, recent decay around an old filling, foreign bodies, such as broken drills, pivot teeth roots, etc., may be determined with absolute accuracy, freedom from pain and with satisfaction to patient and dentist.

The value of the X-ray in the measurement of the permanent teeth before their eruption in order to provide for dental arch correction, the valuable information in the practice of orthodontia as set forth by Tousey and Flint, respectively, are matters which I will not attempt to speak on, my object having been to call your attention to the common and every-day conditions in which the X-ray may be employed to advantage.

There is no field in radiology more exacting in technic than that of dental radiography. In examining small areas of the maxillary bones and one or two teeth the intra-oral method employing the small dental films held on the inside of the mouth gives great satisfaction. The utmost care must be exercised in placing the film and in focusing the tube, else deformity will be apparent on the film when none exists in the patient. Where larger areas are to be investigated the extra-oral method is more suitable, using a large plate on the external surface, the tube being properly focused from the opposite side to the one affected. I prefer in all cases where the extra-oral method is used to make the examination stereoscopically; by this technic we see the entire field in relief and in addition more detail is gotten than by the single-plate process.

Again, it is some times advantageous to make a large single plate for advance information, and follow this up with the small film postured in accordance with information gotten from the preliminary plate.

In conslusion, I would suggest that, unless the dentist has an unusually large practice and plenty of assistance, he have his X-ray examinations made by a regular radiographer, as it is only by experience, plenty of material and close attention to detail that one can become proficient in the art.

309-317 Hutchinson Bldg.

DID AS ADVISED

Dentist—Have you been anywhere else?

Patient—I went to see the chemist in our village.

Dentist—And what idiotic advice did he give you?

Patient—He told me to come and see you, sir!—London Opinion.

PRESIDENT'S ADDRESS*

BY S. J. BOURGEOIS, MORGAN CITY, LA.

ACCORDING TO A TIME-HONORED regulation I am called on to present to you a presidential address, and to preside over your deliberations, conformably to a provision of the constitution of our society.

In accepting this honor I wish to express to you my sincere appreciation and assurances of my heartfelt thanks. I realize that my feeble abilities will fail to give adequate expression to my sentiments. I also realize that it is from no particular merit on my part or any contribution from me that has brought me into the prominence wherein I could reasonably expect such an honor from your hands. But I wish to say to you, however inadequate my abilities may be and how little of a scientific nature I may have contributed to this society, I can assure you that I give way to no man in my regard for this society and its welfare or in my love of the profession which we represent. Suffice to say that this honor is far beyond my deserts, and I feel that the friendship and consideration that you have for me was the only reason for my being in this position; therefore, I appreciate the compliment much more and, were I equipped with an eloquence sufficient, I am sure that it would require volumes to give full expression to my sentiments.

This organization first saw light of day on the 17th of June, 1878. I do not believe there is a single member in the hearing of my voice who was at its birth. While representing a great deal as to the number of years I am afraid our records are not as full of achievements as might be expected. The few who then composed the body felt the necessity of focalizing the light in the dental profession and of elevating that profession to its proper dignity.

Thirty-five years—just consider, gentlemen! Probably in date of organization it will represent one of the oldest organizations in this country among the state organizations. I have no data at hand to substantiate this statement, but, considering this matter, I am satisfied that this long period of existence is not held by many state organizations.

Its history has been replete with trials and vicissitudes, even resulting, at times, in a lapse of meetings in some of these many years, but despite this, this grand old ship has withstood the winds of adversity and, all but wrecked upon the rocks and shoals of professional dissensions and misunderstanding, has weathered every storm; and, I believe, when I look out upon this gathering, it inspires me with the assurance that the old ship shows no evidence of wear, and is now ready to undertake new adventures, and venture forth in the quest of new discovery upon the sea of science. It would fill me with the greatest amount of pleasure, in fact, it would be the proudest moment of my life, if I could contemplate a reunited profession—that the hand of mutual friendship would be extended and bind us under the aegis of one brotherhood for the sole purpose of contributing to the advancement and well-being of the science and art of dentistry in the state of Louisiana.

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*Read before the Louisiana State Dental Society, 1913.

Gentlemen, it is inconceivable to my mind for men who are attracted by but a single purpose to allow a feeling of jealousy towards their fellow-men to enter into their association with each other.

In no achievement, however great, could the entire credit be held by him alone who accomplished it: for whatever achievement any individual member of our profession could accomplish, while rendering lustre to him for its accomplishment, cannot help but shed that same lustre over the entire profession; and to each individual, it makes no difference how humble and obscure he may be, will it lend some of its beneficence too.

So, instead of wanting to criticise or condemn or even to discourage each man in his endeavor to accomplish something, however small that might be, instead, I repeat, of attempting to discourage and belittle him, we ought to extend him a helping hand, pat him on the back, call him brother and lend whatever assistance within your individual power to help him in the accomplishment and success of his undertaking.

Our society's history is filled with too much of the opposite of this condition. I believe, however, that our society is entering upon the great labor of its life. I believe that this meeting here in Shreveport is a move in the right direction; it will have a tendency of enlightening the general public upon the aims and objects of this society and also give expression to its value and importance, not only to ourselves, to this community, but to the entire state.

The public can form no conception of its influence unless we meet in a public way and give expression which will enlighten this public to our importance and value and our contribution to the well-being, welfare, health and happiness of the community in which we live.

Let the future of this society profit by its past to realize how

"Sweet are the uses of adversity;
Which, like the toad, ugly and venomous,
Wears yet a precious jewel in its head."

Let us be a truly representative organization; let our foundation be sure; the character, solidity and body of the superstructure be well fixed and immutable.

Let every one who belongs pursue an active interest in its upbuilding and remember that there is no difficulty to him who wills, and no one should be turned aside or cast down, but remember,

"The wise and active conquer difficulties
By daring to attempt them: sloth and folly
Shiver and shrink at sights of toil and hazard
And make the responsibility they fear."

To prosper the good work we are convened here today, and I hope that the love of the profession of your choice, and your determination to carry out the purpose of our being in the society, will bring fruit.

If in this address I have not fulfilled your expectations, I hope you will deal with me in the spirit of forbearance. I fear that I have already sufficiently taxed your patience; but if a single seed out of the many thrown broadcast shall germinate and bear fruit, I shall be amply rewarded in the reflection that I have at least contributed a humble offering on the altar of science.

> "Clouds may drop down titles and estates;
> Wealth may seek us—but knowledge must be sought."

Determine to excel, and if the summit of our ambitious hopes are realized, we will with an earnest and combined effort place the Louisiana State Dental Society among the excellent of the earth and recognition of its worth will claim the gratitude of posterity.

CASTING OF ALUMINUM *

BY J. H. PROTHERO, CHICAGO, ILL.

A perfect plaster impression must be obtained, using Imperial Investment Compound, which gives a very smooth model. All relief work must be made on the impression, as the model cannot be changed later.

Very thin shellac is applied. Place the model in water to expel air. Allow it to remain until bubbling ceases.

White's Tenex wax is used for the base-plate. It is necessary that the wax be thin. One thickness only is to be used. Extend this a little beyond the line where the plate is to terminate. Use plumpers, if required. The wax must be scrupulously clean, or a residue may cause defects in the casting. The wax must be perfectly sealed all around the edges of model. This is to guard against any investment working in between the wax and model. Cut strips of wax an eighth of an inch wide from the long side of a wax piece; turn this around the heels and tuberosities, to form an inner rim. Form buccal and labial rims similarly.

These strips, having a beveled edge, are to be placed with such edges next to surface upon which attachments are to be made.

Must have perfect undercuts. Small lugs of wax are used for facilitating the rubber attachments.

After investing, the plate should be heated and the casting promptly done, or checks may occur. This is very important. While the flask is heating, a cylinder is placed around it to confine the heat. Place the aluminum ingot in crucible. It will fuse in ten minutes, to fifteen minutes. After prompt pouring of the metal the pump of the vacuum machine is kept going awhile, to insure the metal crystallizing properly.

Sometimes, despite the utmost care in all details, the plate will fail of fitting satisfactorily, at certain points. I take a punch and go over the suspected places and hammer down upon the model.

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*Clinic at Ohio State Dental Society, 1913.

NITROUS OXID-OXYGEN ANALGESIA*

BY MOSES SALZER, M.D.
ANESTHETIST TO THE JEWISH HOSPITAL, CINCINNATI, OHIO

FROM TIME IMMEMORIAL VARIOUS drugs have been used to produce a state of analgesia, by which is meant simply insensitiveness to pain, nothing more, nothing less, and is to be sharply distinguished from the state of anesthesia, in which consciousness is lost.

It is only recently, however, that nitrous oxid has been used to any extent for this purpose. Whether the use of this gas for analgesic purposes is a mere passing fancy or fad, the future alone can decide, but nevertheless the fact remains that this gas possesses many qualities which render it peculiarly fit for the production of analgesia.

In the first place, it is absolutely safe, even in the hands of the inexperienced, if the patient is not carried beyond the analgesic state.

Second, when administered with oxygen or a plentiful supply of air, it is not unpleasant to take; quite the reverse, it produces a sense of pleasing exhilaration.

Third, it is not followed by serious after-effects of any kind, no matter how long continued. The worst that could possibly happen is that the patient may become slightly nauseated or vomit.

Added to these factors of safety and pleasantness is the fact that nitrous oxid is actually capable of eliminating pain without causing loss of consciousness. Its effects can be abolished or increased almost immediately at the will of the patient or administrator and contrary to any other analgesia-producing agent, its effects stop as soon as the administration ceases.

In other words, it is an almost ideal agent for the production of analgesia. And, let us not forget also that it does nothing more, either, than relieve pain when used for analgesic purposes and is not pushed to the state of general anesthesia. Nitrous oxid is not a general cure-all of the horrors of the dentist's chair.

The question now arises, why all this discussion, if nitrous oxid is capable of producing true analgesia and is absolutely safe? There can be no discussion of this point if we limit the use of this gas to the easing of pain alone. It is when we try to do more that we are doomed to failure. The sound of the bur, for instance, cannot be entirely eliminated, short of general anesthesia, and where this sensation is particularly unpleasant nitrous oxid analgesia will not always be a total success. The sense of touch, or the knowledge that something is being done, is also retained.

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*Read before the Cincinnati Dental Society, 1913.

Nitrous oxid short of general anesthesia is not a success in "nervous" patients whose nervousness is not the result of the pain caused, or about to be caused, during the dental operation. I wish to report in this connection a case of Dr. R——'s. The patient was a highly-strung nervous boy of 14 who began to fidget and squirm even before he sat down in the chair. As a test, Dr. R—— placed the bur against the side of a perfectly sound tooth and the boy let out a most unearthly yell. Three cavities, however, were prepared for this boy and he reluctantly admitted after it was all over that it really did not hurt so much after all and that he would prefer to have his work done under gas in the future. It is not a question of pain or no pain in these cases and it is utterly ridiculous, under the circumstances, to rely solely on a pain-relieving measure when what is needed is something to quiet the nerves.

We have the same condition to meet in general surgery. There are many, many operations that can be and ought to be done under local anesthesia or analgesia, but the patients are too nervous and do not want to be conscious of what is going on. The very idea and not the pain gives them the "fidgets" and prevents skillful and successful work. It is possible, however, in this class of cases, after they have once experienced real painless dentistry under nitrous oxid, that they may return a second time more composed and better subjects for analgesia. In other words, they must be educated up-to it.

As a class, these patients will do better by being given some preliminary medication, such as morphia or bromides.

In suitable cases, however, i. e., cases where the pain caused by the dental manipulation itself is the cause of the patient's nervousness, it is truly marvelous what can be accomplished without causing the slightest discomfort to the patient. In one case Dr. R—— prepared eleven cavities in an hour and a quarter, any one of which, he declared, would have taken almost an hour in this patient, who was extremely sensitive to pain and to the heat of the bur which can be totally disregarded under analgesia. After it was all over, the patient declared that he would not mind it for another hour and that he had had a very pleasant time. Dr. R—— was able to extract a pulp without causing the patient any pain and without loss of consciousness.

Nitrous oxid acts by producing an intoxication controlled at the will of the operator. The patient may be made just happy drunk or dead drunk, just as may be desired. Fortunately they very rarely become crazy or fighting drunk.

Among the disadvantages, the question of expense must be considered. The cost of the gas and oxygen is about three dollars an hour and, added to this, will be the expense of having some one to administer it. From what little experience I have had I do not see how it would be possible for the dentist to operate and watch his patient at the same time. It is true that there are various devices on the market by which the patient may administer his own anesthetic but these are of necessity incapable of producing a smooth analgesia, for the patient's hand will not drop before he really is anesthetized; and secondly, instead of the arm relaxing, there may be a tonic contraction of the muscles of the arm which will hold the mask tighter than ever to the nose. By practice, however, a certain measure of irregular analgesia can be produced by these devices. The question of the necessity of varying the percentage will be touched upon later.

It is also true that the office attendant may be educated up to administering the "gas," but I have not yet met the one whom I would permit to practice on me or any member of my family. Even despite the closest watchfulness the patient will occasionally lapse into unconsciousness as occurred in one case of Dr. R——'s, where three breaths were sufficient to produce unconsciousness. These lapses into unconsciousness are not without their disagreeable and dangerous features. The patient may have, though rarely, exceedingly unpleasant dreams, the memory of which may remain, or, he may misinterpret something that is said or done during his recovery which may cause a lasting shock to his nervous system or may seriously compromise the dentist, should he be working alone. Should unconsciousness occur, and it is only the trained administrator who can detect it immediately, all work should be stopped, unless an agreement to the contrary exists between the patient and the dentist. It gives me pain which no amount of gas will alleviate to think of the trouble some patients may cause the long-suffering dentist, if he puts them to sleep when he promised to only ease the pain a little. There is something abhorrent to all of us in the thought of being anesthetized and have our lives, as it were, held in the balance by the anesthetist.

I shall not enter here into a discussion of what apparatus is the best. There is no such a thing. Any apparatus which will deliver an even and constant flow of either nitrous oxid or oxygen, as may be desired, will answer the purpose.

As to the technic of administration, the amount of gas or oxygen must be governed wholly and solely by the patient's sensation and, inasmuch as the sense of hearing is the last to go, we can be constantly governed by the patient's answers and signals. Very often the patient will jerk or make reflex movements which may possibly give rise to the impression that pain is being caused, These movements are not always caused by pain, and, on questioning, the patient will declare that he has had no pain. These movements are purely reflex, i. e., they are of spinal origin, and are entirely independent of any perception of pain. These movements very often occur even under deep nitrous oxid anesthesia, the patient being, of course, deeply unconscious.

The amount of nitrous oxid which will be sufficient for the drilling of a sensitive cavity will be totally inadequate for the extraction of a pulp and vice versa; the amount necessary for the extraction of a pulp will cause loss of consciousness if only a sensitive cavity is being prepared. Then again, each individual case will vary as to the amount of nitrous oxid necessary to produce a definite result. We must never lose sight of the fact that it is analgesia and not general anesthesia which is desired.

To summarize:

(1) Nitrous oxid is a valuable and reliable agent for the production of analgesia.

(2) It is absolutely safe.

(3) There are better nerve sedatives than nitrous oxid.

(4) The procedure is expensive and requires some little care in its administration.

In conclusion, I wish to report two rather interesting cases from the practice of Dr. R——. The reports which follow are in the patients' own words and have not been added to in any way by myself.

Case number one being that of a psychologist connected with the University of Cincinnati, is as follows:

"The experience of taking the anesthetic administered to me by Dr. Salzer for the purpose of removing the nerve from the tooth was rather interesting, and not at all unpleasant. The anesthetic takes effect very rapidly. Within a minute or so, I felt a tingling in my fingers. Then I began to lose the feeling of weight, and was scarcely conscious of the chair I was sitting in. At the same time the sensations in the outskirts of consciousness, such as the noises of the street, or voices in the next room, in fact anything except that on which my attention was immediately fixed, became remote and confused.

"Dr. R—— began to work at the tooth as soon as they thought it safe, and Dr. Salzer instructed me to raise my left hand every time I felt the least pain. I had slight twinges of pain when Dr. R—— first began to work, but they were no more severe than those incidental to most operations in dentistry, and I should not have thought of mentioning them if I had not been instructed to indicate every sensation of pain no matter how slight. A few deep breaths of the anesthetic served to lessen the pain still more, and the final operation of taking out the nerve, and going down into the roots of the tooth caused no more discomfort than a twinge of pain about like a sharp needle prick.

"Just before the removal of the nerve, when I was most deeply affected by the anesthetic, I began to shake with laughter. The doctors, I knew, suspected that I had gone over the verge of consciousness, and was in the hysterical stage of anesthesia, but this was only partially true. I still understood perfectly well all they said, and was able to respond promptly to commands to open my eyes, or clinch my fist. I was also perfectly clear in my own mind as to what I was laughing about, though I doubt if the joke would have seemed so funny without the anesthetic. This was what amused me: I knew that I was near the point of losing consciousness, and nevertheless I could still feel slight twinges of pain. I thought it would be such a joke on the doctors if I reached a point where I could not respond to their instructions to indicate sensations of pain by raising my hand, but could nevertheless still feel the pain. It seems to me now that the joke was decidedly on me, but at the time the idea of the doctors victimizing a helpless patient, who felt pain but could not say so, seemed to me a very absurd outcome to the experiment with the new anesthetic.

"The entire proceeding was over in ten minutes or less, and I am sure I never parted from a nerve in a tooth so easily or so expeditiously before. I suffered a little nausea after the anesthetic, but this was doubtless due to the fact that I forgot Dr. R——'s instruction to eat an early and a very light lunch, and instead ate a late and a very substantial one."

Case number two is that of a physician for whom Dr. R—— prepared four cavities in twenty minutes' time. The following details were jotted down by the patient himself almost immediately after he left the dentist's office:

"After giving my colleague, who kindly administered the gas, an (unsolicited) opinion as to the fit of the mask, I began to smell the gas, which was soon followed by a tingling sensation and I remarked upon an acceleration of the heart beat. This was at once followed by a sense of warmth, which I regarded at the time as vaso-motor relaxation. Then the external stimuli of slight character caused no pain. Gentle application of the bur caused no pain to otherwise very sensitive teeth. More severe application caused a slight sense of pain, which led to reflex muscle movements, indicating my sensation to the anesthetist, because he told me to breathe deeply. I thereby learned at that time, that by increasing the depth of my breathing without being told, I could abolish the realization of pain at will. I was conscious of the dental manipulations, and could readily respond to directions given me. There was at no time any sensation of suffocation or discomfort.

"During the entire process, as far as I know, I was capable of clear reasoning and made mental note of the sensations to report them to the anesthetist. For instance, I was impressed with the clear line of demarcation that separates the realization of outside impressions, such as pain, from reasoning ability. At the time, I thought of a curtain as separating these centers as the best illustration, one or two breaths being sufficient to draw the curtain between the reasoning 'centers' and those which had to do with the perception of pain.

"Inasmuch as the induction of the states of anesthesia and analgesia depend somewhat upon the mental state prior to the administration, I may say, that I was not in the least apprehensive, having taken nitrous oxid on previous occasions to the stage of general anesthesia and having absolute confidence in the ability of the anesthetist.

"While I have emphasized that during the entire time I could reason, there was confusion only once, namely, when the nitrous oxid was discontinued and all the mental processes re-established themselves in, what seemed to me, 'confusing rapidity.'

"After the analgesia there was no nausea or headache or other ill-feeling, but there was a not altogether pleasing sense of exhilaration, which quieted down within twenty minutes under the influence of a good cigar.

"It is known that auto-suggestion, or suggestion, plays an important role in the effectiveness of an anesthetic; but I may say that prior to the administration I did not believe that in me, the gas could induce such analgesia without anesthesia, and so I stated to my dentist. Therefore, the element of suggestion plays no part in my case."

OPPORTUNITY*

BY DR. T. M. DUPUY, D.D.S., ALEXANDER, LA.

ONE OF THE GREAT LIGHTS of the present century said: "Opportunity well improved is the stepping-stone to greatness" and from this there are several palpable truths to be impressed, and which, if properly understood and carried out, would mean great and untold benefit to all mankind.

Dentistry is only in its incipiency and there are opportunities for its improvement every day. We are living in an advanced age of marked progression, where every branch of science is improving and solving the most mysterious problems that heretofore have baffled the most learned and the wisest of men. Today the greatness of man has achieved what years ago seemed absolutely impossible.

By the ingenuity of man, the forces of the air have been harnessed and men are riding through the unknown skies in the now possible "airship." The ether has been mastered, making possible the sending of messages through space without the use of wires. Think of such things! These have been the golden opportunities for the active, thinking man and who knows what man will not do to dazzle the future world?

If the sciences and other professions are making such wonderful strides of *progress,* why not *dentistry?*

The dental profession has a great opportunity and a great duty to perform for humanity. Fundamentally, its duty and its mission is the conservation of public health and on this it must succeed or fail. It may appeal to pride or fashion through its esthetic feature, but it will finally triumph in proportion as it ministers to human health and comfort. If there is anything on earth people will pay money for, it is to be well, to be liberated from physical discomfort.

Who, then, are to be the missionaries of health if not the doctor or the dentist? People will pay any price for the relief of pain and if that pain comes within the scope of the dentist, it is his best opportunity to prove to the public that we are not a trade but a science, based upon the fundamental principles of medicine, tempered by the skill and ability of a well-trained brain.

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*Read before the Louisiana State Dental Society, 1913.

The reason that dentistry has not progressed in the public esteem is simply that we are not making the best of our opportunities to educate the public as to our usefulness, but have simply stopped where we should have begun. All this leads down to the proposition that we must educate the public along the lines of our *specialty*. We must teach dentistry, talk dentistry, and preach dentistry to every man, woman and child, until we have brought the whole human family to realize that dentistry is a necessity. It is a necessity, because it deals with the health of man, and in proportion to his health so will be the proportion of his usefulness to the world.

Now, gentlemen, do you realize that out of 85,000,000 people living in this beautiful, liberty-loving country of ours, only 6,000,000 people actually go to the dentist? Out of 40,000 dentists in the U. S. only 30,000 of them are in actual practice.

Now, if these 30,000 dentists are caring for 6,000,000 mouths per year, you can readily see that every dentist in the U. S. could care for only 200 patients per year, providing, of course, these 6,000,000 patients were to be equally divided amongst the 30,000 dentists. But there are fifteen times as many people not going to the dentist as there are those who regularly go to the dentist; eliminating, of course, those people who simply go to the dentist for extractions and substitution, this places the figure at an average of only 8 per cent. of our entire population under the care of the dentist.

What does this mean? It means opportunity to broaden our field of activity, to reach the homes of these millions of uncared-for children and teach them the importance of caring for their teeth. Not that I look upon the care of the teeth from the purely selfish motive of reaping pecuniary benefit, but because I feel and know that it is for the good of the whole country that we should teach the public the thing that is best for its general welfare.

Did you ever stop to realize or think what a great loss of money it would be, if suddenly all the hotels, restaurants, cafes and buffets and the homes of these 85,000,000 hungry souls were to be suddenly devastated with acute-pulpitis, and every one of these millions of mortals unable to eat and would, therefore, be compelled to go to the dentist? Now, if the average cost of each meal were but 10 cents it would mean the gigantic sum of $8,500,000 lost to the eating business. Now suppose these 85,000,000 souls were compelled to seek the dentist for relief and we were to charge them $1.00 for a 1, 2, 3, mixture of ease and comfort, wouldn't this put $85,000,000 in the pockets of the ever-thankful dentists?

Now what does this prove again? It proves opportunity, gentlemen, opportunity, and it is only by improving these opportunities for the enlightenment of the world that we can ever hope to reach the goal of success. I have simply given you a few figures and facts, to show you plainly where we stand and to point out to you the possibilities of our future.

Are we going to stand back and let all the professions pass us by—doing great work for the general welfare of mankind? I say NO, for "there is a tide in the affairs of all men, which if taken at the flood leads on to fortune.'' As this flood of opportunity has come to the dentist, we would be relegated to the old cronies were we not to take advantage of these golden opportunities, to bring them to complete fruition.

Some people cry ''hard times'' and say they are too poor to go to the dentist. To this I say it isn't so. The people who can afford to have their teeth attended to do not do so because they are too busy making money. People who ride in automobiles have bad teeth and yet—only the rich can ride. The poor must walk, and so it is with life, and yet people will be humbugged. They say they are too poor and yet they wear the best clothes, eat and drink the best and go when and where they please; but their teeth! Well, nobody sees them or cares, so they think, and they let them decay.

Our people spend more money on miscellaneous foolishness than they do on their teeth in a lifetime. Let's see if figures lie. Supposing we place the average life of man at 50 years and we know that during this time man has had fifty-two teeth altogether.

Statistics have been compiled to prove that the average man, during a period of fifty years, having fifty-two teeth, does not spend $50.00 during the fifty years of his worldly existence. This makes an average cost of only 2 cents per tooth per year for fifty-two teeth. Think of dentistry being expensive! Why, it is absurd. The man who smokes and has a barber to shave him spends more money in one year than the average man spends on his teeth during a lifetime.

To be more concrete, suppose a man smokes but a 10-cent cigar every day; then he would smoke up $3.00 per month, $36.00 per year, $360.00 in ten years, or a total of $1,800.00 in fifty years for smoke.

If he gets shaved four times a week and gets four shines and a hair cut per month he spends $3.50 per month, or $42.00 per year, or a total of $2,100.00 for shaves and shines during a period of fifty years. These two items alone combined will make the enormous sum of nearly $4,000.00 for things that are not necessities. Is there not an opportunity, gentlemen, to get some of this money that is being thrown away?

Unless we take advantage of every opportunity to educate the public as to the value of their teeth; the manner in which they should be cared for and the necessity to consult the dentist at least twice a year, we are certainly not going to reap much benefit nor aid much towards the preservation of health and comfort.

The cities of London, Paris, Chicago and New York have already adopted compulsory dental examination among their public school children, and I hope the time is not far distant when every state in the Union will realize the necessity of creating a compulsory education in all public schools. This will be a great blessing to the whole country, because it will be one of the means of preserving the health of our youth, for the youths of our country are the greatest asset of the nation.

In a report from the oral hygiene congress, held in Buffalo, last August, there were 15,000,000 school children suffering from defective hearing, defective vision and mal-nutrition, and out of these 15,000,000 children, 50 per cent. of them, or 10,000,000 children, were suffering from bad teeth, which was interfering with their health.

What a grand opportunity this is for the progressive dentist to forge to the front and save these millions of little souls from the ravages of dental caries!

We are meeting this opportunity face to face and I hope and trust that every dentist in the state will lend his best endeavors to secure the proper legislation that will some day put dear old Louisiana at the very top of *Progressive Dentistry.*

PORCELAIN CUSP RESTORATION*

BY ALBERT L. LE GRO, D.D.S., DETROIT, MICH.

This is a demonstration of the process of reproducing the sulci and the mesial and distal coronal prominences in porcelain crowns. The work is done on articulated amalgam models. Emphasis is laid on the importance of restoring the eminences as a means of properly distributing food and preventing same from crowding into approximal spaces. The details of the method are as follows:

Coping that can be removed from articulated model or coping on jacket crown preparation articulated is built up with modeling compound just short of occluding space for cusps and marginal ridges. This is left flat on top, oiled and warm modeling compound placed on the same and occlusal articulation made by triturating in anatomical articulator. From this a button of the modeling compound is carved containing all the fine grooves, sulci, indication of buccal and approximal contour and marginal ridges. The button is placed in small amount of plaster for female die from which a male die is again made in modeling compound of more generous diameter than original button, to facilitate handling, etc. From this die a matrix is stamped (plat. 1/1000) reproducing all the fine carvings of original button. A button of porcelain is baked in this cup of platinum and the platinum is then stripped of the buccal and approximal periphery as high as possible without stripping the matrix from the fine carvings in the occlusal surface. The button is then put in its position on the articulator and the crown is baked between the coping as a matrix on the one side and the matrix of the occlusal surface of the porcelain on the other, producing a posterior porcelain jacket or Richmond crown as perfect in detail as one is able to carve in any material, no attention having had to be given to shrinkage of porcelain or any of the inconveniences attending the usual carved porcelain crown.

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*Clinic at Ohio State Dental Society, December, 1913.

SOME INTERESTING DENTAL SURGERY

BY A. L. WOOD, B.S., D.D.S., M.D.S., PARDEEVILLE, WIS.

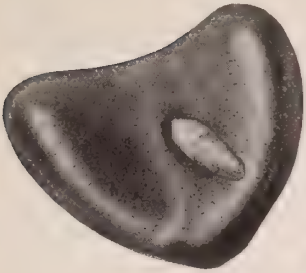

Fig. 1

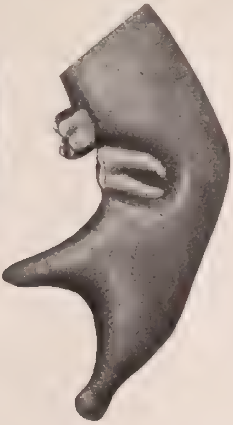

Fig. 2

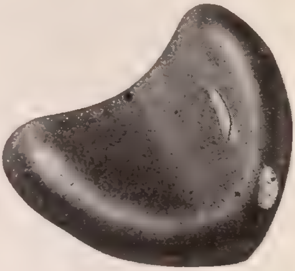

Fig. 3

Mrs. V———, aged 62, called in August with pain, swelling, and pus issuing from a small opening in the roof of the mouth. Patient had been wearing a plate for twelve years. About six months before consulting me she noticed a sore spot in the roof of the mouth. This got so bad she could not use her plate. She went to see a physician who, after examination, told her it was caused by her plate; called in a dentist, who agreed with the doctor, and a new plate was made (a splendid plate). This failed to give relief. She again called on the doctor, who this time lanced the spot and curetted the bone. This made things worse; so after a thorough examination he advised an operation to remove necrosed bone.

Before she would consent to this she decided to have a talk with her old family physician, Dr. B————. He at once referred the case to me. A careful examination disclosed a full-size cuspid lying between the two plates of bone as shown in model No. 1. After sterilizing the surrounding area, I injected non-toxo, cut away the flesh and bone until the crown of the tooth was exposed. I then removed it with forceps. Dismissed the patient with instructions to wash the mouth at least four times a day with *hot* salt water. Four weeks later she was using her plate with perfect comfort.

Mr. W———, aged 50, farmer, called to have his upper teeth extracted. After removing seven teeth and roots, I noticed a small bunch high up under the lip. On close examination it proved to be a cuspid tooth, located as shown in model No. 3. After anesthetizing with non-toxo, I cut away the flesh and bone to expose the crown and show its direction. I then removed it with forceps.

No. 2 shows impacted third molar which came to me after the crown had been broken off. This I removed with Nevius elevator.

BUSINESS·SUGGESTIONS

Our readers are urged to send business suggestions for this department that there may be an exchange of ideas that will be mutually beneficial. Send all contributions to the editor,

L. P. BETHEL, 195 SIXTEENTH AVE., COLUMBUS, OHIO.

THE BUSINESS SIDE OF DENTISTRY

BY "A BUSINESS MAN"

THE DENTIST'S ENVIRONMENT

A dentist's rooms should be so tastefully arranged, so harmonious in appearance and so immaculately clean that they will be a constant source of satisfaction to him and if he is pleased, his patients will also be, so the investment is well worth while.

You have, no doubt, been in offices where the very atmosphere was unpleasant and where you felt that a thorough renovating and overhauling would improve apearances and business too. Other offices that you have been in have impressed you pleasantly where, by the harmony of the furnishings and the generally tasteful appearance, a contented, satisfying feeling took possession of you. I will leave it to you at which place, other things being equal, you would prefer to have *your* dental work done.

The dentist's office should present the appearance of just having left the hands of an efficient and thorough-going house cleaner. The linen should be fresh-laundered and absolutely clean—the floor and furniture should be devoid of dirt and litter—the instruments should be sterilized and bright—the windows and curtains spotless—all of which denote painstaking care. Every detail is likely to be observed by the patient and cannot offend any. Where these conditions prevail, the average patient will inadvertently give the dentist credit for incorporating into his work these very same painstaking characteristics, and the chances are more than even that he will be right in this conjecture.

No dentist can afford to run the risk of offending the sensitive feelings of his most refined patient, and the other kind will appreciate his evident cleanliness and desire to please in these particulars. With these conditions prevailing, all classes, therefore, are pleased; the wealthy and refined, because it is the environment to which they are accustomed; the middle class, because they appreciate it and expect to see it in a model dental office, and the really poor who, from the fact that they are there at all, manifest an interest in such conditions and surely expect to find it in a model office.

Furthermore, the dentist spends by far the greater portion of his hours while awake in his office. That is where he makes his living, and it should be a place in which he can work with greatest satisfaction to himself. The equipment and furnishings should be as nearly ideal as his circumstances will admit, and such as will enable him to do his work with the least amount of physical, mental and nervous strain. By all means, make your office as nearly ideal as is possible.

THE DENTIST'S PERSONAL APPEARANCE

The dentist himself should be the acme of cleanliness. His clothing should be clean, in good condition and well pressed; his linen should be spotless; his teeth clean; his hands thoroughly washed before and often during an operation; there should be no odor of perspiration from his body; he should shave every day; keep his nails well manicured; his shoes well polished and his breath should have no taint of tobacco or liquor. It takes time and care to carry out these conditions, but there is no detail that has been mentioned but one can do for himself with but little outlay of time and care. But neglect to care for any one of the details mentioned may be expensive in loss of business.

The patient may rightfully expect perfect cleanliness and the dentist has no right to expect the best class of patronage and not take every measure to insure himself against offending any. Rest assured the effort will be productive of increased patronage and of the class best qualified to recognize merit. Clothes do not make the man, but they serve as a pretty fair index to his character.

Do not allow yourself to become the victim of any disagreeable habit that would offend the sensitive patient.

THE DENTIST'S EQUIPMENT

The dentist should install in his office the very best equipment that he can afford, taking into consideration, of course, the location, his own personal requirements and the class of people whom he is to serve. His equipment should be up-to-date and should include everything necessary to enable him to do his work easily, quickly and well. He should be discriminating in the goods that he buys, but having convinced himself that a certain article is necessary, he should have it and cause it to contribute to his profits in the conduct of his business and for the purpose for which it is designed. The dentist should not deprive himself of anything in the line of equipment that is necessary to his success. On the other hand, the dentist should not have anything in his office that does not contribute in some manner, for a lot of useless equipment causes an office to look "tacky" and cluttered up.

An established dentist would do well to have duplicate operating rooms, including in them chairs, engines, cabinets, operating equipment, etc. A great many dentists are doing this and find it to be a very profitable investment; for, with a helpful assistant, a dentist's time can be utilized wholly during the comparatively few productive working hours of each day.

Experience has shown in a good many cases that instead of disposing of the old equipment when contemplating the purchase of a new oufit, it is by far a better arrangement to divide a large room or to rent an adjoining room, keep the old equipment and install a new outfit. It has been found to be a very profitable as well as a pleasing arrangement to install two outfits in adjoining rooms exactly alike and such an arrangement is advised when one's practice will admit of the investment.

The Indiana State Meeting

The fifty-sixth annual meeting of the Indiana State Dental Association was held at the German House, Indianapolis, May 19, 20, 21, 1914.

The meeting was a successful one in every way, the attendance being the largest in the history of the society.

The constitutional amendments under the national reorganization plan were adopted and much other business of importance transacted.

Dr. Otto U. King, of Huntington, for many years the energetic and most-efficient secretary, now secretary of the national organization, was elected president.

Other officers elected are: R. R. Gillis, Vice President, Hammond, Ind.; A. R. Ross, Secretary, Lafayette, Ind.; Roy Archbold, Treasurer, Decatur, Ind.; W. R. Meeker; Executive Committeeman, Peru, Ind.; J. A. Stoeckley, Supervisor of Clinics, South Bend, Ind.; Otto U. King, Editor.

Three New Trustees: Victor Knapp, Evansville, Ind; Clem Shidler, South Bend, Ind.; Earl Brooks, Noblesville, Ind.

Delegates to National House of Delegates: George E. Hunt, Indianapolis, Ind.; Charles Redmon, Peru, Ind.; J. O. Zubrod, Evansville, Ind.; Charles Priest, Marion, Ind.; William Kennedy, Indianapolis, Ind. Alternates: Ray Kibler, Indianapolis, Ind.; M. W. Strauss, Huntington, Ind; J. M. Hale, Mt. Vernon, Ind.; J. S. McCurdy, Fort Wayne, Ind.; Carl Lucas, Indianapolis, Ind.

Two features of especial interest were the Progressive Clinic and the Health and Science Conference. The former was carried out most successfully under the able leadership of Dr. John A. Stoeckley, of South Bend, whose efforts were seconded by Drs. J. V. Howard, Indianapolis, and W. G. Downs, Evansville, and a score of lieutenants. It seems hardly possible that anyone who has seen the working of the progressive plan would be willing to return to the old hit-or-miss method of conducting a clinic.

At the general session on Wednesday afternoon, individual members pledged an annual contribution of more than $4,000 per year for five years in support of the Scientific Foundation and Research Commission of the National Association, which was ably represented by its chairman, Dr. Weston A. Price, Cleveland, Ohio.

The Health and Science Conference was well attended. Addresses were made by Charles P. Emerson, A.B., M.D., Dean of the School of Medicine, University of Indiana; Homer C. Brown, D.D.S., Columbus, Ohio, President National Dental Association; George E. Hunt, M.D., D.D.S., dean of the Indiana Dental College; Weston A. Price, D.D.S., M.D., Cleveland, Ohio; J. N. Hurty, M.D., President of the Indiana State Board of Health. Thursday was devoted to hospital and office clinics, the former being conducted by Chalmers J. Lyons, B.S., D.D.Sc., Ann Arbor, Mich., assisted by Carl D. Lucas, D.D.S., Indianapolis.

More than a hundred new members were added and the future of the Indiana State certainly appears to be a rosy one.

EDITORIAL

Dentists and Physicians Co-operate in New Movement for Dental and Medical Inspection of School Children in Ohio.

During the recent meeting of the Ohio State Medical Association in Columbus, Dr. P. B. Brockway, of Toledo, suggested an organization of Ohio physicians who are particularly interested in medical inspection of school children, and the matter was discussed at an informal luncheon held at the Virginia Hotel on May 6.

Inasmuch as dental inspection is closely related to medical inspection in the Ohio work, the president of the Ohio State Dental Society and other members interested in the movement were invited to be present at the luncheon and join the physicians in the formation of a state organization. Much enthusiasm was manifested in the formation of such an organization and there were as many again at the meeting as had been provided for, the dental profession being well represented.

Frank W. Miller, of Columbus, State Superintendent of Education, was present and gave an interesting talk in which he requested the support of the medical and dental organizations of the state in outlining a course in hygiene to be instituted in the schools throughout Ohio.

Mr. Miller pointed out that under the re-organized plan of operating our state school system, six thousand new school teachers will be placed in service every year, and that these men and women should be thoroughly versed in the essentials of hygiene in order that they may convey proper instruction to their thousands of pupils.

Mr. Miller specifically asked that the medical and dental professions appoint a general committee to outline a course of five lectures. When these lectures are prepared they will be presented at various county normal training schools which are provided under the new school administration laws. His suggestions pointed out such an important field that they became chief topics in the discussion.

Plans were made to immediately take the matter up with Mr. Miller and co-operate with him to the fullest extent.

Dr. Brockway, the chairman, called upon almost every physician and dentist in attendance, and the views presented were decidedly interesting. Dr. Brockway outlined as a possible field for an organization of the men interested in the physical supervision of school children the following subjects: Standardization of school inspection; a plan of complete co-operation between the medical and dental professions in this work; an investigation as to whether our present state sanitary regulations are not somewhat archaic in the light of modern medical teaching, and a general effort to educate the public in matters of school sanitation.

Dr. E. R. Hayhurst, chief of the occupational diseases survey, state board of health, was present and suggested that the term "Medical and Dental Inspection" be dropped and that "Physical Supervision" be substituted. The first term attracts considerable opposition, Dr. Hayhurst pointed out. Several commented favorably on this suggestion.

Men from every section of Ohio attending this conference told of the work that is being done in their separate communities and emphasized the importance of some general organization whereby a better working plan for school inspection may be advanced.

In order that some definite organization might be formed Dr. James Rector, of Columbus, moved that Chairman Brockway appoint a committee of five, in addition to the chairman, to co-operate with School Commissioner Miller, and to adopt by-laws for a state organization to promote physical supervision; also to present some general plan for those interested in the work, to be acted upon during the next annual meeting of the Ohio State Medical Association in Cincinnati.

Later in the week, Dr. Brockway appointed the following committee: Drs. W. H. Peters, of Cincinnati, chief medical inspector and assistant health officer; E. F. McCampbell, executive officer of the state board of health; H. M. Platter, of Columbus, chief medical inspector of the board of education; F. R. Chapman, of Columbus, secretary of the Ohio State Dental Society, and Dr. Peterson, of Cleveland, chief of the medical inspection system in the schools of that city.

Dr. Brockway also named as a special advisory committee, Dr. H. C. Brown, president of the National Dental Association, and Mr. Frank Miller, Ohio superintendent of education. Dr. Brockway will, of course, serve as chairman of the committee, and he will call it together in the near future to consider other matters.

We feel that this movement is an important one and we will keep our readers informed of future developments.

A METHOD OF TAKING IMPRESSIONS FOR CROWN AND BRIDGE WORK*

BY DR. FRANK L. WRIGHT, WHEELING, W.VA.

This is a method of taking impressions for crown or bridge. Warm a piece of sheet paraffine and with the fingers mould it over the adjoining teeth, being careful to bring it not quite to the margins. You want a clear, perfect impression of these margins. Have patient, or assistant, lightly hold in place while plaster is being mixed. The wax will pull off with impression, preventing sticking in crevices or undercuts. Pour impression with wax in place, separate, then remove wax. You have perfect model of adjoining margins for fitting crown or other work.

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*Clinic at West Virginia State Dental Society, 1913.

OBITUARY

Alton Howard Thompson

Topeka, Kans., May 14.—Dr. Alton Howard Thompson died at 10:20 o'clock yesterday morning at his home after an illness of several years from paralysis agitans.

Alton Howard Thompson was born April 8, 1849, at Logansport, Ind. His father was of Scotch-Irish descent and his mother of English ancestry. After the death of his mother in 1852, he was taken to Pennsylvania, where he was raised by his mother's people, spending two years of his childhood in Dalton, Ga., where his father was in the banking business from 1856 to 1859. While there, he lived with a Dr. M. H. Banner, a dentist of the old school, who gave him the first suggestion of taking up dentistry as a vocation.

In 1866 he went to study dentistry with Dr. G. L. Dorr, in Mifflintown, Pa. Afterwards he practiced in Millertown, Pa., and made an itinerary of other small towns. He went to Logansport in 1869, and after clerking there a few months drifted out to Topeka. Here he opened an office and practiced for a time, and then attended lectures at the Philadelphia Dental College, graduating in 1872. Returning to Topeka, he was engaged in active practice until the last few years, when he was an invalid at his home.

Doctor Thompson was a prolific writer for dental journals mainly on topics relating to comparative dental anatomy, on which subject he wrote a text book, "Comparative Dental Anatomy," which was published in 1899. This book is now being revised by Dr. Martin Dewey and will be published during the summer.

Following this, with his other hobbies, archaeology and anthropology, Doctor Thompson carried his studies of the comparative relation of the teeth to the different races, and made some extensive investigations on the Peruvians, Mexicans and Mound Builders. The list of scientific articles by Doctor Thompson covers the field of dentistry as few others have done.

In 1880 Dr. Thompson assisted in founding the Kansas City Dental College and he was identified with it continuously, until his sickness, as professor of "odontography, human and comparative." In the winter of 1899-1900 he went to Philadelphia and was connected with the Philadelphia Dental College for the session, teaching comparative anatomy.

A year ago the national society presented Doctor Thompson with a purse of $1,000 in recognition of his research work in the interest of the profession.

Vines Edmund Turner

Full of years and of honors, Dr. Vines Edmund Turner, of Raleigh, a leading figure in the dental profession in North Carolina, at one time the head of the National Dental Society, died May 11, aged 77 years.

Doctor Turner was in active practice up to ten days before his death. Last year he was appointed one of the three members of the United States Navy Research Board, having duties connected with dentistry in the navy.

Three children survive: Dr. Charles R. Turner, of the faculty of the University of Pennsylvania, at Philadelphia; Dr. Henry G. Turner, of Raleigh, and Mrs. Henry M. Wilson, of Raleigh.

Doctor Turner was born in Franklin county, North Carolina, January 21, 1837, attended the high school at Henderson, graduated from the Baltimore College of Dental Surgery in March, 1858, and practiced at Henderson until the war between the states began. He entered the Confederate army in 1861 as second lieutenant of infantry, was promoted to adjutant of the Twenty-third North Carolina regiment in 1862, to captain in 1863, and was serving on the staff of Major-General James A. Walker at the surrender. He was wounded in the battle of Cold Harbor in 1862. He went through all the campaigns of the Valley of Virginia under Generals Jackson and Early.

Through his entire professional career Doctor Turner was justly regarded as one among the leaders in his profession. He has been honored repeatedly and deservedly with high position. He was a charter member and twice president of the North Carolina State Dental Association, organized in 1866. For twenty-five years he was president of the North Carolina Board of Dental Examiners. He was president of the Southern Dental Association in 1881, president of the National Association of Dental Examiners in 1901, one of the vice-presidents of the dental section of the ninth International Medical Congress in 1887, president Jamestown Dental Convention in 1907, a member of the National Dental Association and treasurer of the same in 1904-5-6, and elected as its president in 1908. In 1913 he was appointed as one of the three members of the United States Navy Reserve Board. High honor was shown Doctor Turner in 1908, when in Baltimore a banquet was given him by distinguished dentists in honor of his fifty years' service as a member of the dental profession.

Panama Pacific Dental Congress

OPENS AUG. 30TH, 1915

The work of organizing the Panama-Pacific Dental Congress is progressing in a most satisfactory manner. A few foreign countries and a few of our states have yet to appoint Executive Committees to carry on their part of the work of publicity and securing program and memberships.

Three hundred thousand "stickers" bearing the seal of the Congress and the date on which it will convene, have been sent to dealers in dental and pharmaceutical preparations throughout the world, all of whom have expressed a willingness to attach them to every package and letter sent to their customers between now and August 30, 1915. Demands are already being made for more "stickers," and probably one hundred thousand more will be distributed. The Congress will in this way be brought before the attention of every dentist in the world, not once, but many times, and no one will be allowed to forget the date on which he should be in San Francisco to participate in what promises to be the world's greatest Dental Congress.

Work is progressing rapidly on the Auditorium in which the Congress will meet, and it will undoubtedly be housed in one of the largest and most complete buildings ever erected for such a purpose.

The Congress will be in keeping with the Exposition of which it forms a part, and every effort will be made to provide for the comfort and entertainment of every member. That work on the buildings for the Exposition is advancing rapidly may be noted from the fact that the Machinery Hall is now over eighty five per cent. finished. This building is 968 feet long and 368 feet wide. Over 7,500,000 feet of lumber has been used in its construction, and it is the largest frame building in the world.

SOCIETY·ANNOUNCEMENTS

National Dental Association.

TENTATIVE PROGRAM

The National Dental Association will hold its 1914 meeting in Rochester, N. Y., July 7 to 10. The House of Delegates will hold its first session on Monday, July 6, at 11 A. M., and it is important that all delegates be present at this time.

The first general session will open at 11 A. M., Tuesday, July 7, and the local committee have hopes that Governor Glynn will be present to make the address of welcome. This will be responded to by Dr. B. Holly Smith, Baltimore, Md. The president's address will be followed by an address by Dr. Victor C. Vaughan, president of the American Medical Association.

The second general session will be held in Convention Hall at 8 P. M., Tuesday, and will be a symposium by the Research Commission with Drs. Weston A. Price, Thomas B. Hartzell and Russell W. Bunting as speakers. At the Wednesday evening general session Dr. Joseph C. Bloodgood (M. D.), of the Johns Hopkins University, will discuss "The Early Recognition of Pre-cancerous Lesions of the Mouth and Tongue." At the Thursday evening general session two selected papers will be presented from Sections I and III.

The program for the section meetings has not been entirely completed, and two or three papers will be added to the following list: DR. J. R. CALLAHAN, Cincinnati, *"Some Phase of Root Canal Treatment;"* A Symposium, *"Possibility of the Elimination of Pain From Dental Operations,"* (a) W. H. DEFORD, Des Moines, Iowa, *"General Anesthesia and Analgesia by Somnoform;"* (b) J. P. HENAHAN, Cleveland, Ohio, *"General Anesthesia and Analgesia by Nitrous Oxide and Oxygen;"* (c) KURT H. THOMA, Boston, Mass., *"Local Anesthesia of the Oral Cavity;"* (d) W. T. JACKMAN, Cleveland, Ohio, *"High Pressure Anesthesia;"* DR. E. J. EISEN, Milwaukee, *"Dental Radiography;"* DR. HERBERT L. WHEELER, New York City, subject to be announced; DR. FRED W. GETHRO, Chicago, subject to be announced; DR. J. D. PATTERSON, Kansas City, *"Pyorrhea Alveolaris;"* DR. C. H. OAKMAN, Detroit, *"Oral Hygiene;"* DR. CHALMERS J. LYONS, Ann Arbor, *"The Pathological Significance of Impacted Teeth;"* DR. DAYTON DUNBAR CAMPBELL, Kansas City, *"Some Basic Principles and Methods in the Reproduction of Mandibular Movements;"* DR. WM. A. GIFFEN, Detroit, *"Technic for Making Impressions and Models for the Construction of*

Artificial Dentures," demonstrated with motion pictures; DR. A. J. BUSH, Columbus, "*Classification of Fixed Bridge Work With Law Governing Its Application;*" DR. CARL B. CASE, Milwaukee, "*Evolution of Root Movement;*" DR. JULES J. SARRAZIN, New Orleans, "*Properly Constructed Bridges and Their Hygienic Care;*" DR. HOMER C. BROWN, Columbus, "*The Responsibilities of the State Society Officers;*" DR. OTTO U. KING, Huntington, "*The Business Side of the State Society Work.*"

The Clinic Committee is to present a Progressive Clinic on Wednesday morning, commencing at 9:30 o'clock. They have secured a list of exceptionally high-class clinicians for both the Progressive and General Clinic. The General Clinic will be given on Friday morning and full details of the clinical program will be presented through the *National Bulletin* and later journals.

The Local Committee has selected the Powers Hotel as headquarters and reservations should be made as early as possible. A full list of hotels and rates will appear in the *National Bulletin.* This committee has made ample provisions for a large meeting. All except the evening general sessions will be held at the Exposition Park under most favorable conditions. The superintendent of the park has assured us that the temperature of these buildings can be regulated so that July weather need not interfere with our comfort.

All reputable practitioners of dentistry and medicine are cordially invited to attend this meeting.

Fraternally,
HOMER C. BROWN, *President,*
Columbus, Ohio.
OTTO U. KING, *Gen. Sec'y.,*
Huntington, Ind.

Virginia State Dental Association.

The next meeting of the Virginia State Dental Association will be held at Old Point Comfort, July 1, 2 and 3, inclusive. All ethical dentists are invited to attend.

C. B. GIFFORD, *Cor Sec'y.*

New Jersey State Dental Society.

The twin cities by the sea (Ocean Grove and Asbury Park) will again entertain the members and guests of the New Jersey State Dental Society. The forty-fourth annual convention of the society will be held in the North End Hotel, Ocean Grove, N. J., on July 15, 16, 17, 18, 1914, beginning at 10 A. M. on Wednesday, July 15.

The North End Hotel is one of the largest and finest on the Jersey coast and is situated directly on the beach front at the foot of Wesley lake and within a moment's walk of the Asbury Park Casino and trolley. Connected with the hotel by a bridge over the board walk is a large pavilion built over the ocean. The second floor of this pavilion will be devoted exclusively to the exhibits and clinics.

Dr. Walter F. Barry, 220 Essex Ave., Orange, N. J., is chairman of the Exhibit Committee and has made an ideal arrangement of space for the exhibits. Dr. Barry will be glad to furnish information regarding the rates and space still available.

The clinics will be in charge of Dr. James I. Woolverton, 228 West State street, Trenton, N. J. Plenty of space will be available so that crowding will be avoided and every one will have a chance to see the clinics.

The meetings of the society and the reading of papers will take place in the hotel, either in the American dining room or in the picture theater, as will be announced in the program which will be issued about July 1.

At the hotel end of the bridge a room will be reserved for the officers of the society as headquarters and this will be the executive office and bureau of information during the convention.

A cordial invitation to attend is extended to all ethical practitioners.

JOHN C. FORSYTH, *Secretary,*
430 E. State St., Trenton, N. J.

Xi Psi Phi Fraternity, National Alumni Association Annual Meeting

"GOOD-FELLOWSHIP, NOT POLITICS"

Place—Rochester, N. Y.

Date—July 6. All functions will be held on this day so as not to conflict with the sessions of the National Dental Association.

Headquarters—Hotel Seneca. Register on arrival in the Xi Psi Phi Parlor on the Mezzanine. An entire floor has been reserved for our members.

Functions—Annual dinner in the large banquet hall of the hotel at 6 P. M. Members of international respect will do the toasting. Be sure to send your acceptance without further notice to Dr. George C. Lowe, 813 Chamber of Commerce Bldg., Rochester, N. Y., so that reservation may be made for you. *This is important* so that the correct number may be provided for.

The annual business session will immediately follow the banquet. Matters of the utmost importance will come up for disposal and your presence is, therefore, strongly urged.

Membership Committee—Kindly get in touch with Dr. C. C. Markey, 1436 Peoples Gas Building, Chicago, Ill.

C. O. SIMPSON, *Secretary,*
St. Louis, Mo.
L. M. WAUGH, *President,*
Buffalo, N. Y.

National Mouth Hygiene Association

ANNOUNCEMENT

A series of illustrated lectures on Mouth Hygiene is being prepared by this association for rental service.

The first lecture of the series, a talk suitable for a mixed adult audience or school pupils above the age of twelve years (designated as lecture "A") is now ready.

The lecture set (manuscript and thirty-six slides) will be furnished to members of state dental societies and others who may be considered as competent to present the matter to the public, at a rental fee of One Dollar per use.

For further particulars and application blanks address

EDWIN N. KENT, D.M.D.,
Director of Extension Lectures.
222 Washington St., Brookline, Mass., U.S.A.

Sixth International Dental Congress (London)
Section X—Dental Education

The subjects for report to be followed by discussion are:

(1) The Teaching of Bacteriology for Dental Students: Methods of Teaching; Extent of Teaching. Reporters, Mr. J. Howard Mummery and ——————.

(2) A Practical Synopsis of Medical and Surgical Teaching for Dental Students. Reporter, Dr. Godon.

(3) First Principles in Practical Teaching. Reporter, Dr. Gaddes.

(4) Methods of Teaching Orthodontics to Dental Students. Reporters, Dr. Guilford and Dr. Martinier.

The mornings of the 5th, 6th and 7th of August to be devoted to Reports, and the afternoons to Independent Papers.

The committee of the Section is desirous of obtaining names of gentlemen willing either to discuss the above subjects, or to read papers on "Dental Education."

F. BOCQUET BULL, Guy's Hospital, London, S.E.
GEORGE SHEPPARD, 59 Merrion Square, Dublin,
Honorable Secretaries.

Idaho Board of Dental Examiners.

The next regular semi-annual meeting of the Idaho Board of Dental Examiners will be held at Boise, Idaho, on Wednesday, July 1, 1914, at 9 A. M. in the State Capitol building. Applications for examination must be made before July 1. For blanks and further particulars apply to

DR. A. A. JESSUP, *Secretary,*
Boise, Idaho.

Montana State Board of Dental Examiners.

The Montana State Board of Dental Examiners will hold their annual meeting in Helena, Mont., July 13 to 17, 1914, inclusive. All applications must be in the hands of the secretary ten days prior to the opening of the meeting. Examination and license fee, $50. For other information and examination blanks address the secretary,

Dr. Gilbert A. Chevigny,
Clark Block, Butte, Mont.
Dr. Ralph R. Rathbone, *Pres.*,
Dillon, Mont.

North Dakota Board of Examiners

The next regular meeting of the North Dakota Board of Dental Examiners will be held in Fargo, N. D., July 13, 14, 15 and 16, 1914. All applications must be in the hands of the secretary by July 3, 1914. For further information apply to F. A. Bricker, *Se'cy.*,
Fargo, N. D.

National Association of Dental Examiners

The thirty-second annual session of the National Association of Dental Examiners will be held at the Rochester Hotel, Rochester, N. Y., beginning July 6, at 10 A. M. and continuing until adjournment.

Every state board holding membership in the association is earnestly requested to have at least one representative present at this session. Members of all state boards are invited.

Hotel reservations should be made immediately, as the National Dental Association meets in Rochester during the week beginning July 6 and the attendance undoubtedly will be large.

A. E. Honey, *President*,
Kalamazoo, Mich.
T. A. Broadbent, *Secretary*,
15 E. Washington St., Chicago, Ill.

Wisconsin State Board of Dental Examiners

The Wisconsin State Board of Dental Examiners will convene in Milwaukee at Marquette University on June 22d, 1914, at 2 o'clock P. M. for examination of applicants to practice in Wisconsin.

High school diploma, application and $25.00 fee to be filed with the Secretary fifteen days prior to above date.

Dental diploma to be presented in advance of the examination.

Junior dental students presenting a clear card for two years' unconditional work from a reputable dental college and filing a high school diploma, or its full equivalent, will be permitted to participate in the theory examination in the following six major subjects: Anatomy, physiology, histology, chemistry, bacteriology, materia medica. The grades made in these subjects will be credited at subsequent examinations.

Special application blanks for this examination and $10.00 fee, together with high school credits to be filed fifteen days in advance.

F. A. Tate, *President,*
W. T. Hardy, *Sec'y.,*
1404 Majestic Bldg., Milwaukee, Wis.

South Dakota Board of Dental Examiners

The next regular semi-annual meeting of the South Dakota Board of Dental Examiners will be held at Sioux Falls, South Dakota, on Tuesday, July 7th, 1914, at 1:30 p. m. Applications for examination must be made before July 1st. For blanks and further particulars apply to

Aris L. Revell, *Secretary,*
Lead, South Dakota.

Pennsylvania State Dental Society

The forty-sixth annual meeting of the Pennsylvania State Dental Society will be held at the Bellevue-Stratford Hotel in Philadelphia on June 30th, July 1st and 2d, 1914. Luther M. Weaver, *Sec'y.,*
7103 Woodland Ave., Philadelphia.

Northern Indiana Dental Society

The next annual meeting of the Northern Indiana Dental Society will be held August 28 and 29 at Culver (Lake Maxinkuckee).

O. A. Van Kirk, *Secretary,*
Kendallville, Ind.

Idaho State Dental Society.

The Idaho State Dental Society will hold its annual meeting in Boise, June 29 and 30, 1914. T. P. Carnes, *Sec'y.*

New Jersey State Dental Society

The forty-fourth annual convention of the New Jersey State Dental Society will be held at the North End Hotel, Ocean Grove, N. J., July 15th, 16th, 17th and 18th, 1914.

An attractive meeting is being arranged and a cordial invitation to attend is extended to all ethical dentists. John C. Forsyth, *Sec'y.*

American Society of Orthodontists

The next annual meeting of the American Society of Orthodontists will convene in Toronto, Ontario, Canada, July 2, 3, and 4, 1914.

Wm. Ernest Walker, *Secretary,*
Nos. 629-31 Maison Blanche, New Orleans, La.

The Tennessee State

Fourth annual meeting, Chattanooga, Tenn., June 25-26-27, 1914. Fine program, ample accommodations. Every ethical dentist welcome.

C. Osborn Rhea, *Secretary,*
Chattanooga, Tenn.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXIV JULY, 1914 No. 7

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The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

PYORRHEA UP TO DATE*

BY THOMAS B. HARTZELL, M.D., D.D.S., MINNEAPOLIS, MINN.

PROFESSOR OF CLINICAL PATHOLOGY AND ORAL SURGERY IN THE COLLEGE OF DENTISTRY AND RESEARCH, PROFESSOR IN MOUTH INFECTIONS IN THE COLLEGE OF MEDICINE OF THE UNIVERSITY OF MINNESOTA

THIS SHORT PAPER IS AN EFFORT on the part of the writer to convey as clearly as possible the status of pyorrhea treatment at the present time. It is written for the present only. We may at any time have vital reasons for changing our belief regarding the treatment. If we do, the author reserves the right to alter his opinion at a moment's notice. The wish is the father of the thought in the minds of many men who have attributed pyorrhea to specific micro-organisms, and it is truly unfortunate that these same men do not verify the thought. If such had been the case, the etiology of this disease would have been worked out to an absolute certainty long ere this. However that may be, we are at least justified in the conclusion that pyorrhea is primarily a bacterial disease, though we do not know whether it is due to a single organism or not. The fact that we constantly find micrococci and bacilli in great numbers in every pyorrheal condition as well as many other bacteria which are more or less constant in pyorrheal conditions, is reasonable ground for assuming that bacteria are essential to the process of this type of inflammation, and it is entirely possible that the recent work of Hansen has proven the relationship between streptococci, staphylococci, pneumococci, and the bacilli which are so commonly found in the lesions associated with destruction of the alveolar process.

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*Read before the Ohio State Dental Society, December 4, 1913.

The writer for many years believed that mechanical factors, such as malocclusion, were directly causative factors in this disease. He is now of the opinion that malocclusion is not a directly causative factor but an indirectly causative factor, and is not responsible for bone destruction to so great an extent as he formerly believed; and he is also of the opinion that malocclusion and all other types of mechanical imperfection are only etiological factors insofar as they induce congestion of the tissues or mechanical irritation by over-application of force, which induces congestion of the blood stream leading to edema and a weakening of tissue resistance, making possible a more rapid and easy incursion of the bacteria constantly resident upon the tooth's surface and adjacent tissues. From a clinical standpoint, the author finds an absolutely constant relation between the most heavily-loaded, bacterial-bearing surfaces of the teeth and the occurrence of pyorrhea pockets. Of course, mechanical imperfections in the human denture which permit the incursion of food under the gum margin or the injury of the gum margin in any way, all tend toward congestion and the preparation of the tissues for infection; nevertheless, it is true that if soft tissues adjacent to the teeth receive such care as will keep them firm and elastic and the teeth are kept physically clean, comparatively little infection will occur even though mechanical imperfection exists. When in this type of denture infection does occur, it is generally the interproximal tissues that suffer first, emphasizing the fact that the protected areas, where bacteria grow undisturbed, furnish the infection.

Pyorrhea treatment involves two general lines of attack. The first line of attack involves the tooth's surface both of crown and root. The second line of attack is the effort to establish in the mouth immune conditions which tend to make the mouth less habitable for those common forms of organisms found in pyorrhea pockets, which condition of immunity is brought about by encouraging the formation of immune bodies in the blood and saliva of all individuals suffering from this disease. The first line of attack is purely mechanical and consists in polishing out the imbrication lines in the enamel, rendering the tooth less habitable for bacterial plaques and teaching the patient how to disclose and remove bacterial growths from the tooth's exposed and interproximal surfaces, after which root surface is removed by surgical procedure. The second line of attack which has yielded the author the greatest benefit has been along the line of diet and auto-vaccination, encouraging the patient to eat those foods which tend to create a normally alkaline saliva. The foods which bring about this desirable condition are the fruit acids and vegetables. The ingestion of fruit acids and vegetables produces alkaline saliva, while the exclusion of fruit acids and the large use of carbohydrate foods tends to produce acid salivary secretions.

Pyorrhea pockets are always more or less flaccid. Therefore, the proper polishing of the tooth's surfaces and the removal of bacterial plaques should be accomplished as a first step in the mechanical treatment of the disease, so that when the second step in the mechanical treatment is undertaken, the bacterial growths on the tooth's surfaces and polishing materials will not be thrust into the granulating pockets around the tooth's root.

In pyorrhea, as in every form of infection, nature endeavors to protect the rest of the body from further incursions of the irritant by walling off the living healthy tissues about the pockets by a multitude of leucocytes, just as an infection in an appendix is frequently walled off from the tissues of the adjoining intestines by leucocytes and new connective tissue. What surgeon has not, in his practice, numerous cases of old appendiceal inflammation which have been walled off from the general circulation in this way, the patients perhaps having lived out their lives and died of some infection other than that in the inflamed appendiceal region? The walling off of the infections which occur around teeth is an evidence of nature's effort to protect the body; and the destruction of the bone of a socket and a final loss of the tooth is only an effort on the part of nature to rid the body of one source of infection, which is both root and crown surface.

Where the individual has sufficient vitality to withstand the constant absorption of toxins, leucomaines, and bacteria from the infected walled-off areas about the teeth until such time as the tooth is lost, he may eventually be cured through the extrusion of the teeth themselves. And it is noted that many people pass through periods of physical depression during the loss of their teeth, who, subsequent to the loss of their teeth, become comparatively well and strong again. The bacteria-holding power of the root's surface itself is readily demonstrable by any one who cares to examine prepared root surfaces under the magnifying lens. The amount of root surface which can be safely removed is also easily demonstrable and the depth to which the root surface may safely be removed without exposing to further infection the bone cells of the cementum.

Recurring to the thought of the bacterial nature of this infection, I wish to draw your attention to the fact that the most constantly reported organisms found in pyorrheal infections are first micrococci, which, under cultural conditions, generally grow in short chains. Next to the micrococci we find diplococci, and so frequently do we find the diplococcus that many individuals have believed that the diplococcus was a positive etiological factor. We also find many spirochæte and many short bacilli. Naguchi of the Rockefeller Institute for Medical Research has been able to grow three families of spirochæte, which have been grown by other men as well, namely, Cohn, Koch, Mühlens and others, none of which families are pathogenic so far as Naguchi knows at the present time, though an injection of one of them produces a cellulitis in the tissues of the monkey. These three families of spirochæte are actively motile and often found in pyorrhea pockets and in other parts of the mouth. Goadby describes what he designates a strepto bacillus found in the mouth fluids, which organism I have not been able to demonstrate in any of the cases thus far studied by me. The author finds, however, that the micrococcus before spoken of grows plentifully in almost every case and has been able to demonstrate it in smears from the tissues as well as in smears made from the deeper root-surfaces and also in smears and cultures made from root ends of abscessed teeth when extracted. Occasionally this organism will hemolyse blood; while in other cases what seems to be apparently the same organism will not hemolyse blood, though the same in other cultural characteristics. Thus far the organism is not pathogenic for rabbits, showing a rather low degree of virulence. This would be in keeping with the character of the ordinary pyorrheal inflammation which rarely, if ever, produces a virulent fulminating process. Judging from the wonderful recent studies of Rosenow reported on page sixty-one of the Transactions of the Chicago Pathological Society, July 1, 1913, from which I will quote presently, it seems eminently probable that the diplococcus so frequently found by Madalia and others and the micrococci, staphylococci and streptococci found by many others and the author, may be all one type of organism, changing its character under varying cultural conditions and oxygen tension, for Rosenow has been able to transmute the streptococcus viridans into a typical pneumococcus. In a recent communication he states:

> "By appropriate means I have been able to convert fourteen strains of typical hemolytic streptococcus into streptococcus viridans. After this transformation had taken place the affinity for the joints of the organisms as hemolytic streptococci disappeared and just as in other strains of streptococcus viridans the affinity for the endocardium became apparent. It therefore seemed that these strains just as other strains of streptococcus viridans could, by animal passage, be converted into pneumococci. This was found actually to be the case. Two of these strains were converted into typical pneumococcus and one into streptococcus mucosus as well. Nine strains of pneumococci and five strains of streptococcus mucosus have been converted into typical pneumococci, four into hemolytic streptococci and one into streptococcus viridans, hemolytic streptococcus and pneumococcus. For the complete transformation of streptococci into pneumococci, animal passage has thus far been found necessary. The transformation is gradual and it takes from eight to twenty-five

animal passages. Subcutaneous, intraperitoneal and pleural injections make for greater changes than intravenous injections. In this series six strains which had been converted into pneumococci, two of which were originally hemolytic streptococci, one streptococcus mucosus and three micrococcus rheumaticus were selected and studied intensively to determine whether they were really pneumococci. All were at one time typical lanceolate, encapsulated diplococci indistinguishable morphologically from known pneumococci. All fermented inulin, none precipitated serum glucose agar, all produced green colonies on blood-agar plates and acid when grown in pneumonic serum. All were soluble in bile and autolyzed in Na Cl solution under ether. They grew quite readily in streptococcus broth culture filtrates but not in pneumococcus (Marmorek's test) behaving like other pneumococci in this respect. All were highly virulent to animals (rabbits, guinea-pigs, white rats and mice), killing each by rapidly fatal pneumococcemia. Rabbits were immunized with one strain as a hemolytic streptococcus and the same strain as a pneumococcus. The former gave rise to the formation of specific anti-bodies (opsonin) to the homologous and other streptococci while the latter gave rise to a specific increase in opsonin to the homologous and other pneumococci. The transformation seemed complete. During the intermediate stages the acquired properties tend to disappear and the organism may revert to what it was originally, but after the transformation is complete the acquired properties become quite fixed, and the strains now behave quite as do those which are obtained from the usual sources. In order to change the characteristics it is necessary to place these organisms under stress or strain. This seems to call forth latent energies which do not manifest themselves under ordinary conditions. Of the many ways that have been tried to bring about important changes, the growth in symbiosis and other bacteria, especially B. subtilis, on blood-agar plates, and growth under varying degrees of oxygen tension and variations in salt concentration proved most effective. When hemolytic streptococci are grown under relatively low oxygen tension their hemolysing power is maintained; when grown in pure oxygen they lose this property gradually and become green, producing streptococcus viridans. This fact would seem to explain why streptococcus viridans predominate on the surface of normal or only moderately diseased tonsils and other mucous membranes, when at the same time the crypts harbor hemolytic streptococci in predominating numbers."

April 12, 1913.

Rosenow has proven that organisms change from one type to another under different condition of oxygen tension and animal passage. The brilliant work of Larson and Barron on a case of fusiform bacillus infection, isolated from the blood stream, in the service of Professor Ries, in which the author had the good fortune to be associated, confirms the general proposition, made clear by the work of Rosenow, that the transmutation of bacteria is a more or less common occurrence. In this particular case, the fusiform bacillus is at present perpetuated in the laboratory and Professor Larson has been able, by appropriate means, to change this bacterium to a spirochæte and have it again revert to the bacillus form, which explains the fact that we generally find the fusiform bacillus and spirochæte growing together. In teeth, we have ideal conditions for this transmutation. Take, for instance, an organism which grows freely in the open air on the mucous membrane, which organism, by reason of its own motility or the continuity of tissue or the driving power of occlusion, which is enormous, is projected beneath the gum margin and is removed from direct oxygen supply, thus losing certain elements necessary to a given form of growth, perhaps gaining the power to hemolyse blood but still retaining certain pathogenic possibilities which make for mild and chronic infection. This organism may have been a streptococcus to begin with and, under the changed cultural conditions, become a pneumococcus, which may, by reason of symbiotic growth with other organisms, change its character to produce, suddenly, a virulent and destructive inflammation, resulting in the rapid loss of teeth and bone.

The writer realizes that he is injecting into this discussion unproven factors. He is doing it, however, to stimulate research on this phase of this problem for those who may be interested in a final solution of the etiology of inflammation arising in the tissues contiguous to the teeth.

To continue our subject, which is "Pyorrhea Up To Date," the author will briefly and rapidly sketch the outline of the most successful treatment at present in vogue in a large number of cases. *First,* comes disclosing by appropriate stain the bacteria on the tooth's surface; *second,* removing by mechanical means the bacterial flora from the tooth's surface, at the same time rendering the tooth's surface brilliant and free from the etching caused by the acid of the bacillus acidi lactici.

We know that the surfaces of newly-erupted teeth show deep imbrication lines or grooves, which afford bacteria lodging places. Hence, to free the tooth's surface from bacterial coat and to lessen its bacterial-holding power, it should be highly polished, brilliantly so. Therefore, I say, polish the enamel, giving to it a high degree of brilliancy if possible. When this is completed, the next step should be the removal of the dead root surface together with such calcific deposits as may have accumulated on the root's surface. This should be accomplished with a plane of self-limited cutting depth so that the operator will not endanger infection of the bone cells or cementoblasts of the deeper layers of the cementum. The result of such surgical interference is to remove the primary focus of infection which the leucocytes cannot reach, for the reason that there is always a slight space to be bridged across between the tissues surrounding the root and the root itself after the bone of the alveolar process has been destroyed. This, together with the fact that the product of the bacterial growth on the root's surface breaks down the leucocytes nearest the root surface in the surrounding leucocyte wall, makes it practically impossible for healing ever to occur spontaneously through leucocyte activity unless the tooth be extracted or the dead root surface removed. In either event, rapid healing occurs.

If the tooth be of sufficient value to make its further retention advisable, the removal of the dead root surface makes possible the rapid filling of the space created by loss of bone and peridental membrane fibre with new blood cells in a few hours. The rapid filling of this space is encouraged by surgical interference for a second reason, namely, the breaking down of the leucocyte wall and the bruising and rupture of the capillary ends permeating the leucocyte wall, removes the sluggish inner coat of leucocytes which have been injured by their long presence near the principal focus of infection, which is the root surface, so that they, the leucocytes, have lost their motility and further protective power. The operative interference, of course, brings a new and revivified blood supply to these tissues and promotes rapid filling of the pockets and crevices between the teeth with new tissue. It is a positive rule, proven by the observation of many hundreds of cases, that if the dead root surface can be successfully removed, the outpour of leucocytes and coagulable material into the areas where the tissues have been destroyed will fill pockets of varying depth in a few hours.

Since the work of Macewen, of Glasgow, has proven the fact that new bone arises from bone cells and not from periosteum, the contention of Professor Znamensky, of Moscow, that the scraping out of the pocket resulted in many cures for him, and the contention of your own enthusiast, Doctor Fletcher, that the bone should be burred and curetted after pyorrhea treatment, takes on added significance. We find, therefore, that if we can bring about the necessary conditions for new bone formation that we would have in a properly-treated fracture, we can just as surely expect to have some new bone formed around the roots of teeth, following as a result of our root surface surgery. Therefore, after surgery of the root surface has been properly accomplished, our next step is to bring about the conditions necessary to the development of new bone, which, in brief, are: (1) freedom from pressure of surrounding soft tissues, (2) asepsis, (3) quiet, by which I mean immobility of the teeth themselves, and (4) exposure of new bone cells. To illustrate, one would not expect a fractured bone to unite rapidly if the broken bone were in constant movement, nor would one expect an area between the resected ends of bone to fill with bone cells if there were pressure of surrounding tissues which would prevent the delicate out-growth of new bone cells from projecting themselves into the area. Therefore, freedom from pressure becomes essential. The condition of asepsis necessary to the growth of new bone is accomplished by perfect root surface surgery; that is, the removal of every vestige of dead infected material from the root, and the curetting of the process edge stimulates a fresh outpour of new bone cells. This does not necessitate deep or vigorous cutting of bone, but only a sufficient scraping or cutting of the bone edge of the process to expose healthy bone cells and promote free hemorrhage, which mechanically flushes bacteria out of the bone and tissues.

The third requisite in a successful operation which looks toward the formation of new bone is the protection of the new bone cells from pressure of the overlying soft parts. This is best conserved by imprisoning, if possible, some of the blood clot which results from the curettage of the bony process, and, at the same time, refraining from massage of the gums during that period in which we may reasonably expect an outpour of new bony material.

Actual massage of the gums ought never be commenced until all hope of bony regeneration is over, after which time the vigorous massage of the gums certainly creates added resistance to recurrent infection. The blood clot is a medium in which new connective tissue and new bone cells readily project themselves, and, if the blood clot can take the place of the lost alveolar process and peridental membrane for the time being, we have the most ideal matrix into which the new bone cells will penetrate and at the same time prevent the soft tissues from crowding in over the lowered process edge, which crowding or shrinking of the tissues necessarily limits bone production from the process edge.

A fourth consideration in a successful operation is to preserve as nearly as possible an aseptic field.

The fifth consideration is to limit the movement of the teeth themselves if they have lateral motion. If lateral motion has not supervened on account of the loss of process, then no further consideration of that phase of the question is necessary. If the teeth have movement, they should be splinted together so as to render them immobile, for the dual reason that the movement of the loose teeth prevents new bone formation and also encourages renewed bacterial incursion.

Providing the teeth are immobile, the last consideration is to close the pockets to the fluids of the mouth, thus shutting out new bacterial ferments, making for the destruction of those bacteria which surgery of the root surface and bleeding have failed to dislodge. This is the most difficult thing of all and can only be approximated. It can be approximated, however, by the use of such substances as will adhere to the soft tissues of the gum and the teeth. The author has been unable to find any substance which would maintain itself for any considerable period of time. The best that can be expected of any sealing solution in the mouth is but a few hours of use. These few hours, however, the author believes are vastly important.

The substances in use by the author are either sandarac varnish, or a saturate solution of iodine in creosote, painted on the gum and tooth's root surface, which latter solution is immediately followed by a saturate solution of tannic acid and glycerine as recommended by Adair. Either of these substances will cling for some hours. The iodine-tannic acid solution is more valuable than the first-named because the iodine coated on the tooth's neck inhibits bacterial growth as well as aids in the formation of collodion-like film, which effectively, for the time being, closes the pocket to further bacterial incursion. If, in the process of healing, shrinkage of the newly-filled-in material occurs and the pocket does not remain level full of leucocytes, the necks of the teeth may be thoroughly cleansed again and the newly-formed tissue gently stirred with a curette, thus again filling the pocket with new blood which may be sealed anew. This operation can be repeated every third to fifth day in obstinate cases or as often as the operator can observe a material benefit from its repetition.

Where the vitality of the individual has been greatly reduced and where the predominant organism found in the pockets can be successfully obtained and cultivated, a vaccine may be made and used which will increase the patient's resistance to recurrent infection. It is to be noted, however, that if the surgical treatment of the root surface is carried over a period of some weeks, breaking down the wall of leucocytes about two or three teeth at a treatment, and permitting a suitable period of time to intervene between treatments so that the enormous number of bacteria introduced into the blood stream from the pocket can be absorbed and destroyed by the blood stream, thus calling out after each treatment an increased supply of anti-bodies, then the patient finishes his period of treatment with renewed energy. The time permitted to elapse between each treatment should be sufficient to enable the individual to overcome the absorbed bacteria, and, as a rule, make unnecessary the use of a vaccine, whereas, if the treatment is hurriedly completed within a brief period of time, the enormous dose of bacteria which the patient must of necessity absorb and take care of, not infrequently produces an anaphylaxis which leaves the patient in a worse condition physically than he was to begin with and encourages recurrence of infection. Therefore, in undertaking the treatment of any given case, the general physical resistance of the patient should be carefully studied by the operator and the bacterial dose which he is able successfully to withstand and overcome should be carefully noted, in order to get the greatest amount of good which the treatment can afford.

In the average case, gradual removal of the principal focus of infection so timed as to increase the patient's resistance of the unavoidable auto-inoculation, is all-sufficient. In the occasional case where the operation is not so timed as to tend toward an increased resistance for the patient, then the continued stimulation of anti-bodies must be sought for by the use of vaccines or by the method of Doctor Osborn or Doctor Dunlop. That the former method is better than the latter must be evident to all on account of one particular fact, namely, we have not hitherto known which of the various types of bacteria we find in our pockets is the essential one, unless the recent studies of Hansen, of Norway, whose research for the discovery of the specific organism, proves correct, in which case a scientifically-correct vaccine would become possible, though I am still of the opinion that the secondary organisms found in these suppurating pockets have as much to do with reducing the patient's vitality as might the specific organism if such there be. We all know that the mixed infection occurring in diphtheria has almost as much to do with reducing the patient's vitality and certainly has more to do with the furious inflammations of the throat's surfaces than the Klebs-Löffler bacillus. So in tuberculosis, the individual who suffers from a pure tubercular infection has a much greater probability of ultimate recovery than the individual who is weak to streptococcal infection and whose tubercular infection is vigorously complicated by streptococcal infection, particularly of the pulmonary lesions; and Hansen's work seems to prove that both staphylococci, and streptococci are more virulent, when growing in company with bacillus pyorrhea than when growing alone, so that even though the specific organism be found, the utilization for the patient's good of the organisms found in the pockets of all types that have destructive power is the ideally correct method.

We are at present struggling with the problem of isolating and studying the organisms found in these conditions. Whether or not this labor will result in benefit is at present a matter of conjecture.

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DISCUSSION

Dr. F. H. Skinner, Chicago: Regarding the excellent paper, "Pyorrhea Up To Date," it is so nearly in accord with my own ideas of the subject that to discuss it is entirely out of the question, but I can and do wish to emphasize some of the points brought out. Dr. Hartzell speaks of imbrication lines and the necessity of polishing them out. In the average case, the enamel has become so etched from fermenting substances which have been left on the teeth before patients present themselves, that it is necessary to use the planes to prepare the gingival enamel for polishing, and in occasional cases, enamel is imperfectly formed. This, also, must be planed down. The work of getting the tooth surfaces and mouth clean, before the planing of deep pockets, cannot be carried out too thoroughly, and at this stage, only, do I differ at all with the essayist. I believe, when cleanliness is maintained, i. e., polishing of the tooth surfaces every three or four days and the administration of the borated oxygen gas for a period of from two to four weeks, that the surgical instrumentation of deep pockets can be accomplished with less pain to the patient, that sometimes less instrumentation will be necessary, and that, in the majority of cases there will be less ultimate recession of the gum tissues, and we will have a more healthy process for the teeth to rest in, after the case has been cured.

In the weekly or bi-weekly polishings, a disclosing or staining solution should be used to locate deposits on the teeth, and it also produces very good moral effect on the patient to give him a hand mirror and let him see how rapidly accumulations gather, even though his teeth were perfectly clean when he last left your office.

From the time treatment is started until the case is dismissed, the teeth should be kept free from bacterial patches and calcic deposits. In this way the patient learns what a clean mouth feels like and will learn to be much more careful and particular about allowing irritating substances to gather again.

There are many reasons why planing instruments, and not scrapers or files, should be used for this work, some of which are that we can leave smoother surfaces, the work can be performed with more delicate manipulation, with more accuracy and with much less pain to the patient.

It is very seldom that I find it necessary to curette the process, because the tissues are so built up by the use of the Dunlop vapor that they respond very rapidly when I simply remove the deposits and plane the roots to the hard layer which just underlies the cementum.

The congestion of the tissues, spoken of earlier in the paper, can be relieved by the previous use of the Dunlop vapor, and the less destruction there is, the less recession there will be, the less tissue for Nature to restore.

The suggestions regarding splinting, etc., are good and should be carried out by every one doing pyorrhea work.

The iodin-creosote and glycerol of tannin preparations of Dr. Adair's are, to my knowledge, the best sealing agents which have been given, so far, to the profession, and should be in general use by men treating pyorrhea.

Dr. Osborn's treatment is a new one to me and I wish the essayist would tell us a little more about it when he closes the discussion.

This is one of Dr. Hartzell's short, concise matter-of-fact papers and is, as its name implies, up to date on pyorrhea.

We are fortunate in having such a man doing research work on pyorrhea for the National Dental Society.

*DR. M. H. FLETCHER, Cincinnati: Regarding the etiology of the diseases of the gums and sockets and after speaking of those who attribute the pathology to "Specific micro-organisms" the essayist says: "However that may be, we are at least justified in the conclusions that pyorrhea is primarily a bacterial disease, though we do not know whether it is due to a single organism or not. The fact that we constantly find micrococci and bacilli in great numbers in every pyorrheal condition, as well as many other bacteria, which are more or less constant in pyorrheal condition, is reasonable ground for assuming that bacteria are essential to the process of this type of inflammation."

To say that bacteria are essential to this type of inflammation or "that pyorrhea is primarily a bacterial disease" or that suppurative alveolitis is associated with pus is like saying that the tubercle bacillus is essential to tuberculosis.

If the term Pyorrhea Alveolaris is properly used it can mean nothing but a flow of pus from the alveolar bone, but there are stages of the disease preceding the flow of pus and also extended pathology following it in which the flow of pus is not much in evidence.

Simple gingivitis is followed by destruction of the thin edges of the alveolar process; this procedure may continue until quite a portion of the socket and its membranes are destroyed before infective bacteria find lodgment in the wound; when they do, however, it may be any one or all of the infective germs mentioned by the essayist in the bacteriology of the disease, but not a definite and single variety. With possibly one or two exceptions these germs found in connection with alveolitis are also common to any infected wound, especially of the bones (Osteitis).

As stated by the essayist, there is so far little or no evidence of a specific germ causing Suppurative Alveolitis. If this be true, and I believe it is, it is simply paradoxical to speak of an auto-genetic treatment, auto meaning "self," and genetic "produced." In the therapeutics this means, a material for treatment produced from the special germ which caused the disease. If there be no special germ there can be no self-produced treatment for it. However, if a patient has reached a pyemic stage of the disease, such as I have several times seen and such as has just been described by Dr. Grieves, then a stock serum or vaccine of an anti-pyemic type can be used for its beneficial effect upon the general system. Aside from this I cannot conceive of vaccine or serum therapy having an effect upon any stage of alveolitis.

The dental profession made an unconscious mistake in using the unappropriate name Pyorrhea Alveolaris for the diseases of the gums and sockets. However, there is no good reason why we should perpetuate this mistake by persistence in its use.

At this time a few men like Dr. Hartzell could change this to the credit of the whole profession, but the longer it is allowed to go on, the harder the change will be to make.

The term Alveolitis, meaning inflammation of the alveolar bone, is now found in medical and surgical dictionaries and seems to me most appropriate, since it permits of thinking and talking intelligently about the disease in all its phases and sequelae.

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*Probably the last public work done by Dr. Fletcher, who died at his home in Cincinnati on March 26.

For local conditions use the following terms: Gingivitis or Simple Alveolitis, Necrotic Alveolitis, Suppurative Alveolitis or "Pyorrhea Alveolaris."

For constitutional disorders arising from Oral Sepsis use the following terms: Alveolitic Dyspepsia, Alveolitic Enteritis, Alveolitic Anemia, Alveolitic Septicemia, Alveolitic Pyemia, etc.

We all know that the conditions mentioned and many others arise from diseases of the gums and sockets, so why not adopt a name appropriate to the conditions and the source of the disorder. We will then more easily learn the disease in all its symptoms and phases, and learn to treat it according to its variety and the stage of the variety presented.

It has been said that "It is infinitely easier to learn something new than to unlearn that to which we have become accustomed." I believe if the essayist could have his mind cleared of preconceived ideas and eliminate the term Pyorrhea Alveolaris from his sub-consciousness he would see the simple history and pathology of the diseases of the gums and sockets as they are, and that he would then exercise the right he claims "to alter his opinion at a moment's notice." Simply look at those conditions as you would an infected joint wound, or a wound involving bone and the over-lying soft tissues in any part of the body, and apply to the diseases of the alveolar bone the known laws of pathology and treatment, then call it by a natural name which admits of describing all its symptoms and stages, from incipient lesion to local necrosis, suppuration and constitutional disorders, frequently to septicemia and death. This conception of the disease permits of the consideration and intelligent treatment of any phase of Alveolitis which may need the most immediate attention.

A case that has reached the pyemic stage of septicemia (Pyemic Alveolitis) needs immediate attention for the life of the patient. When this danger is past, the next most important phase must be attended to, and so on until the original source is eliminated.

The laws of pathology teach us that we cannot have diseased tissues without a lesion. The gums of the human teeth, during the whole of adult life, have a constant and ever-present cause for lesions where they come in contact with the teeth. You will note this disease never starts anywhere but at the gum margin. The cause of the lesion is more often tartar which has become hard and irritating. Bands, rough fillings, the edges of cavities, etc., may simulate tartar in its effect upon the gums, periosteum and bone. These things are continuously irritating because they are stationary and fastened to the teeth. In no other place in the body can such conditions be found. A splinter or foreign substance in the tissues elsewhere would be floated in pus until it reaches the surface and is discharged. In alveolitis the irritant is attached to the tooth and can be disposed of only by the tooth itself being thrown off. This, Nature will do and will continue to try to do unless the cause be removed by the doctor. During this process of throwing off a tooth (which is only Nature's effort to heal a wound or to throw off a foreign body) all the stages of inflammation, diseased bone and the over-lying tissues may be found that are found in other diseased bones of the body. In Alveolitis, however, inflammation of the bony socket is perpetuated by the ever-present calcic deposits about the teeth, or by the bacterial infections which have found lodgment in the cancellous bone. Infections may perpetuate the disease long after the deposits have disappeared from the roots. Often the death of bone through this infection is very extensive, reaching the antrum or nose. In the lower jaw much cancellous bone may be destroyed.

Another type of infection, which it has been my lot to observe for the past twenty years, is that of the periosteum. These cases of periosteal destruction have been found in every case of tic douloureux that I have ever seen and when the periosteal lesion has been induced to heal, the tic has disappeared. For further details on this point I refer the essayist to my published articles on the subject, especially one on "Periosteal Caries" published in the *Journal of the American Medical Association*, June, 1899.

It does not seem to have been generally observed that extended cases of necrosis and suppuration of the alveolar processes (Necrotic and Suppurative Alveolitis) may involve all the surrounding tissues, and be the cause of Septicemia (Septicemic Alveolitis) going as far as the pyemic stage and death. Other cases may result in Tic-douloureux, as stated, with all its horrors, all having their origin in diseases of the gums and sockets. Again, all manner of constitutional disorders may result (Constitutional Alveolitis). When this is fully realized by the dental profession they will not think so lightly of a simple gingivitis which almost invariably results in more or less Alveolitis and its many evil results. They will also realize, as the essayist has so well described, that when this disease is properly comprehended and intelligently treated, a very large percentage of cases get well, especially if taken in their early stages. We are thus relieving humanity of many disorders and great suffering.

This brings us to the treatment which has been so well described by the essayist.

In the first place, ''bacterial flora'' on either the crowns, root surfaces, or in cavities, are just so many points of distribution of bacteria, which are ready to attack any vulnerable tissue or organ within their path, from the beginning of the alimentary tract to its end.

The photo-micrographs and other pictures shown by the essayist illustrate well the extended surfaces and localities which should have scrupulous care from the doctor, whose business it is to teach his patients how to care for them after he has once gotten them well.

The essayist says the ''first line of attack is purely mechanical.'' This is naturally the established practice. In my hands this fact is thoroughly impressed upon the patient and they are taught that the lack of cleanliness is the cause of the disease. They also are taught how to prevent accumulations; that is, how to do the prophylactic work themselves. After the case is sufficiently recovered to leave it in the hands of the patient, the doctor should see it from one to four times a year for inspection, and treatment if necessary, but many patients do the work so well that even annual treatments may not be necessary.

The essayist's method of leaving sterile blood-clot undisturbed in the wound is the soundest of surgical principles. Oft-times it is up to Nature to heal wounds in spite of the doctor, where he persists in disturbing this healing fluid by too frequent treatments. Regardless of any doctor and his treatment, no wound can heal without sterile blood and its products. The method of protecting the clot, as described by the essayist, is unique and rational.

His practice of planing off the root surfaces, I believe to be more important in the removal of foreign bodies than the removal of infected crypts. The blood itself, I believe, will take care of the crypts if all calcareous deposits are eliminated.

The complete cleansing of root surfaces necessarily wounds the bone tissue and a blood clot is the result, which is Nature's protector, healing balm and building material.

If the zone of infection, necrosis, or suppuration is greater than the blood clot can care for, it is the doctor's business to know it and by the proper use of sterilizers, bistoury, bone curettes, or bone burs, remove more of the offending tissue so that the work to be done will lie within the limit of the repairing power of the locality and character of the tissue involved. The foregoing is the normal and established method of treating any wound, and it is up to the physician to have the knowledge and adopt his tactics to the laws of repair, since they cannot change to suit him.

Splinting very loose teeth is as necessary as it is to splint broken bones in other parts. They may get well without this assistance, but their chances of recovery and after-usefulness are much greater if the tooth is held in a firm position long enough for the bone to repair about it. This will occur, as referred to by the essayist and as shown by researches in my own practice. A complete restoration of all the lost bone cannot be expected, but such repair as can be accomplished by the remaining healthy, reparative tissues, does occur, and as a surgeon says, we have as the result "a healthy stump." This tissue will remain healthy so long as the exciting cause is kept from returning. This is done by the proper watchfulness on the part of the patient and the doctor.

It is unfortunate for countless numbers of patients that many of the dental profession assume that Suppurative Alveolitis "cannot be cured." The pronounced success of the essayist and those he has taught, as well as that of many others who have seen numberless cases recover, disprove such a statement and go toward proving that if the laws of physiology, pathology and repair are comprehended and their dictations followed, countless numbers of teeth can be saved that are now lost, and as great a number of patients relieved of or saved from severe bodily disease. This, I believe, would place the profession among the greatest benefactors of mankind.

Studies of the bacteriology of the disease by the essayist and others, are fraught with great benefit to us. Such labors serve to establish facts regarding the etiology and progress of the disease. So far, this work, in consideration with the surgical pathology of other wounds, has established in my mind the belief that Alveolitis should be considered under the head of surgical pathology. In any of its stages it is a simple trauma or an infected trauma, often with far-reaching local and constitutional disorder. Looking at the disease from this viewpoint greatly simplifies its comprehension and establishes its rational treatment.

If it should be found that some specific micro-organism does play a large part in the disease, this in no way would change the necessity of what I consider the demand for surgical interference and its following treatment. There would only be added the reasonable cause for possible benefit in the use of auto-genetic serum or vaccine treatment, as an adjunct to the surgical treatment.

Dr. Hartzell's opportunities for investigation are so ample, his language and frankness so attractive and convincing, that I wish he could either show me the faults in my conception of the etiology and pathology of the disease, or that he would apply to these pathological conditions the same reasoning that is applied to similar conditions in other parts of the body. If he has arrived at the "moment" where he can "alter his opinion," I believe his influence will be second to none in portraying the simple principles involved in the comprehension and treatment of Alveolitis and its sequelæ.

†Dr. ——————: Dr. Hartzell very wisely expresses his belief that Pyorrhea is an infectious disease that may have a specific origin, but says that he reserves the right to change his opinion at any time. This leaves us as much in the dark as ever, as to definite etiology and consequent treatment; and necessarily compels us to continue the quest for the final definite knowledge we all so much desire. It also compels us, as the essayist has done in the paper, to exercise our ingenuity to devise technical treatment which will relieve the distress of our patients whilst we are making such effort as may be practicable to work back from results to causes.

The essayist seems to discredit the commonly-accepted idea that malocclusion is an important factor in causation. At the same time he implies that the dissolution of the supporting alveolar process is due to the weakened resistance to bacterial invasion, due to chronic congestion and edema. He also believes that the forces of mastication, acting as a magnified power, tend to inject the extraneous and infective deposits on tooth and gum surfaces into this debilitated tissue, increasing the inflammatory process and causing bone solution by intensifying the absorbent processes. We have never believed that ordinary malocclusion in an otherwise normal mouth was an active cause of peridental disease, except insofar as it was made contributory in providing conditions more favorable for the secure accumulation of deposits which become sources of irritation or infection. We must, however, recognize the clinical fact, that as all peridental diseases seriously affect the root environment, to the same degree the vital functions are interrupted, and there is lack of stability and resistance to the forces of occlusion. This instability increases as the disease process extends, to the extent that sooner or later the teeth assume such malpositions as to preclude any kind of occlusal function of value in food trituration. We also find that, owing to the increased inflammation and sensibility of the peridental structure, the forces of mastication are correspondingly interrupted. Under these conditions we find, therefore, that the possibility of forcing infection into the debilitated areas, if there be such a contributing function as Dr. Hartzell believes, should be to a degree compromised. May it not be that this valuable precaution of the sense organs is the chief reason why the progress of infection in these tissues is generally so slow in its progress as to cause us to believe that it is not a specific infection, but that the peculiar environment and functions of these tissues and organs necessarily confine the process to the more physiologic degenerative type? I do not mean by this that it is not pathologic, but that the progress of the pathologic process is held in check by the very nature of the tissue involved and the high degree of resistance offered because of their persistent function and high vascularity and strong trophic powers of repair. In other words, the balance of health is so strongly entrenched that infection, for instance, does not have a chance to assert itself with the same virulence and celerity that it ordinarily would under more favorable circumstances in other tissues. Owing to the limitations on my time, I can speak of only one more suggestion, which it seems to me is worth emphasizing, and at the same time with a word of caution. The author believes that it is practicable to so stimulate bone development by surgical curettement, which will eliminate all necrotic tissue and produce vital surfaces favoring tissue formation, under conditions of asepsis with protection from irritating functional interference. We know that in all other parts of the system bone growth can be secured even in old people, if the tissue can be kept at rest and the trophic functions be stimulated to a normal degree. There should be no reason why we might not expect similar results in the alveolar process if we can maintain like conditions. Clinically, I have found that this is practicable within the limitations of these essential principles. If the patient is not so old that the senile processes are operative, or he is in reasonably good health, or not suffering from some chronic disease that interferes with general repair processes, it is practicable by reasonable surgical procedure to get a satisfactory degree of tissue restoration. The essayist's suggestion of limiting the operation to only such teeth as may be treated thoroughly by an approved surgical process, which keeps in mind all the aseptic requisites and the parts operated to be protected and put in a state of practicable rest, and not molested by subsequent therapeutic interference which destroys all natural attempts at repair, we have no doubt will result in restoration to a fair degree of health tho supporting hard as well as soft tissues of the root environment. The extent to which this may be carried will depend largely on the conditions involved and it may not be expected where the vascularity of the tissues is deficient, or where there is no competent repair tissue to draw upon. In other words, we can not hope to reproduce alveolar process in extensive gum recession even in young and healthy patients, nor alveolar process, though well covered and protected with gum tissue, with decrepit, or diseased constitutions, offering no general support, or, what is usual, inhibiting the best efforts we can make. We believe the essayist makes a fair claim to a reasonable degree of repair tissue when conditions are favorable.

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†No name was signed to this written discussion.

Our companions are our mirrors and show us what we are. "Men are known by the company they keep."

"Tell me what it is that you are busy about during your hours of leisure," says Goethe, "and I will tell you what you are."

REMOVABLE BRIDGE WORK*

BY JOHN L. KELLY, D.M.D., NEW YORK, N.Y.

THE OBJECT IN MAKING REMOVABLE bridge work in preference to fixed, in very extreme cases, is to give a masticating surface with an appliance that is sanitary and that does not subject the supporting roots to abnormal stress. The two important points to observe in all forms of bridge work are sanitation and properly distributed stress. Without these a bridge is worse than useless because it is actually injurious. The fact that a bridge is removable makes it possible to keep the mouth and teeth sanitary, but the fact that it is removable does not always mean that stress is equally distributed. Placing saddles upon ridges does not always alleviate the abutments from abnormal weight; this depends upon the kind of attachment used.

We know that a normal ridge is more flexible than a normal root; therefore, any attachment that is fixed firmly to the root and moves only in harmony with it, cannot move in harmony with the ridges, which are of greater flexibility, without causing an artificial movement in the root. The attachment, whose principle of retention depends upon friction only, does not have play between its parts, and consequently with one part fixed firmly to the root and the other to the bridge, it necessarily forces the root, so attached, to move abnormally in order to be in harmony with the movement in the ridges, upon which the force of mastication is directed through the bridge. For example, let us suppose that the root moves one-sixty-fourth of an inch and the ridge moves one-thirty-second of an inch normally. If the bridge is fixed to this root by an attachment that allows no play, then the saddles, supported by the ridges of greater flexibility and moving in harmony with them, compel an artificial movement of one-sixty-fourth of an inch in the abutment. Thus one of the important objects for removable bridge work, the preservation of the root, is destroyed by the very principle of such an attachment.

The preservation of the roots can be obtained by that attachment only which does not put greater stress upon them. The one I am describing fills that requirement, so essential but yet lacking in every attachment I have hitherto used. The flexibility of this attachment comes into play each time the saddles would force the root to move with the bridge and by compensating for the extra movement in the ridges, saves the root. The attachment is simple, consisting of three parts: the holding post, the adjusting tube and the bridge tube. The holding post, which is made of round iridium platinum wire, generally fourteen gauge, and about one-eighth inch long, is soldered to the cope in such a way that it will not interfere with the placing of the teeth or facings. Its axis should always incline mesially or distally, labially or lingually in order to form an undercut with one or more like posts, a projecting tissue or both.

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*Clinic at the Ohio State Dental Society, December, 1913.

For the sake of clearness permit me to show two cases. The first is a lower, where only the cuspids remain. In such a case the holding posts are soldered to the distal of each cope and inclined lingually and mesially about one-sixty-fourth of an inch. The second case is an upper jaw with two molars. Here the holding posts are placed so that their long axes are directed distally and lingually to form an undercut from side to side across the arch. This position of the posts also forms a dovetail with the anterior eminence thus locking the bridge on its anterior, posterior, and lateral sides. The dovetail or undercut produced by the inclination of

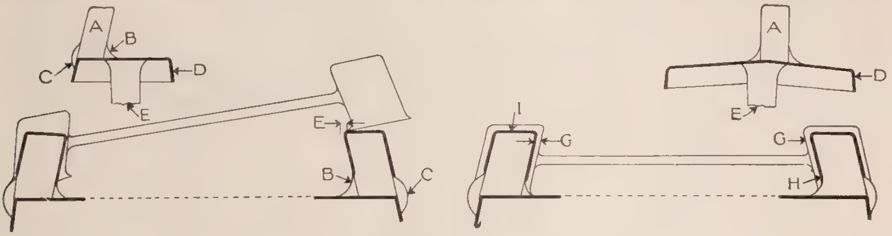


Fig. No. 1

Four different views of the attachments in relation to the copes and in their relations to each other:

1. A transverse section of the mesial distal view of attachments. A, holding post; B, C, fillet; D, cope; E, dowel pin.

2. A buccal lingual view of the same attachments.

3. Bridge tubes connected by a bar in the act of being placed on adjusting tubes (indicated by heaviest lines), which are in position on holding posts at base of which fillets B C are shown.

4. Bridge tubes (G) connected by a bar in place on adjusting tubes (H) and holding post. Space between G and H shows amount of play between tubes when in position.

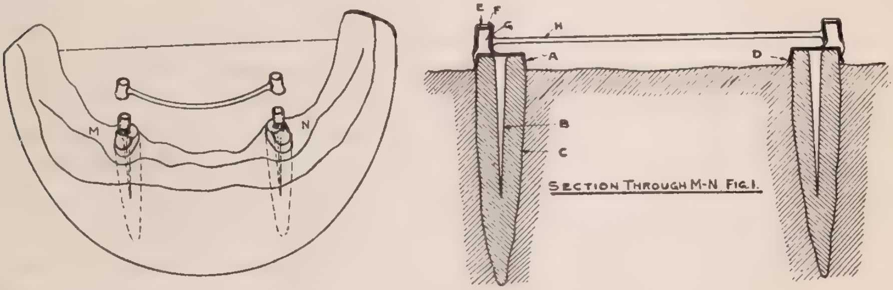


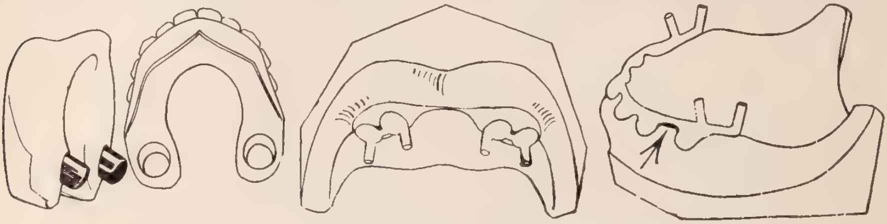
Fig. No. 2

Fig. A. Model of lower case where only the cuspids remain, showing root, pin, cope, holding post (M N), adjusting tubes and above, bridge tubes connected by bar.

Fig. B. A transverse section of the same model. A, cope correctly adjusted to root. B, dowel pin in root. C, root. E, bridge tube. F, adjusting tube. G, holding post. H, connecting bar. D shows cope incorrectly adjusted to root, which happens in adjusting cope when root is not properly prepared.

the posts toward each other and the surrounding tissue is the means whereby retention is obtained.

The degree of retention may be varied at will, for the length of the posts, their amount of inclination, the number of posts, and the formation of tissue are all factors in obtaining it. By intelligent manipulation of these the desired retention is obtained. The adjusting tube simply centers the bridge tube upon the holding post during the process of construction to make sure of play in the completed case. It is used in the completed bridge only in such cases where the holding posts have not been inclined enough to give sufficient retention. The bridge tubes are carried in the bridge and telescope the holding posts, thereby retaining the bridge in position. Sometimes during the process of adjusting the bridge in the mouth on the posts, the bridge tubes are reamed too much, when it will be necessary to use the adjusting tubes to compensate for the enlargement.



Figs. Nos. 3, 4 and 5

Cut No. 3 shows an upper where only two molars remain. The bridge is retained by dovetails formed by the inclination of the attachments to each other and to the anterior eminence of the jaw.

Cuts Nos. 4 and 5 are an upper and lower showing how inclination of the attachments secures retention. The arrow points to space beneath the connecting bar which should never rest upon the gums.

This method of retention as you see, is entirely different from the method of the removable bridge where the screw, spring, or slide is used. In those cases the entire bridge may be supported by one attachment which obtains retention by friction, whereas, with this method, one attachment only would be useless, since retention depends upon the relation of two or more to each other. Sometimes after describing this attachment and explaining how I obtain retention by the convergence or divergence of the posts to or from each other I am still asked how it is possible to obtain sufficient retention with a flexible attachment and without resorting to friction. The answer is so simple that it is even questioned at first until verified by experience.

ADHESION

In every removable bridge I aim to obtain and maintain adhesion as I do in a plate. This is the means of retention nature has provided and man cannot improve—simply assist it. Artificial appliances that assist nature are successes, others failures. Naturally, adhesion sometimes fails as in chewing upon something sticky, for instance. It is then that this attachment comes into play. When the bridge is lifted from the ridges the attachments, forming a slight dovetail, bind it long enough to allow the tongue and muscles of the cheeks to act and throw it back to place. For, besides adhesion, the tongue and muscles of the cheeks assist in retention whenever necessary. Their power for retention is always latent and, although never used in cases of fixed work, it is quickly developed when necessary, as in the wearing of a plate. I always depend upon this power to assist in retaining a bridge. Use develops the function of these muscles and soon they become so educated that they work automatically without inconveniencing the patient. In attachments that give retention within themselves these natural means are entirely ignored and the stress, continually centering upon one or more abutments, weakens them and shortens their period of utility. If one reason for removable bridge work is the preservation of the roots, let us use an attachment that will not put more strain upon them.

Before I close let me make just a few statements about the preliminary work. This is much more important than it would seem and much more neglected than it ought to be. Most failures can be traced back to inadequate preliminary work. Much can be written on it but suffice to say that in all extreme cases where only a few teeth remain, these generally loose, the first step is to cut them off and make a plate. Cutting the teeth off is a delicate matter with the patient sometimes and frequently a red flag to many a dentist. But experience has proven that it needs only common sense and practical knowledge to convince the patients that every tooth in such a condition needs, first of all, rest to bring it back to normal, just as any overworked organ, muscle, or nerve needs rest; that it is much better to sacrifice one part of a tooth in order to retain the other part in preference to losing the entire tooth as is the case when the force of mastication causes it to move abnormally.

The reason for making plates are many—*first,* to give the patient a masticating surface; *second,* to obtain the correct relation of the jaws by opening the bite, very important where most of the posterior teeth have been missing for some time and the bite has become more or less closed; and *third,* to gain time for studying the case. This last is very important. Changes may occur under what may appear to be most favorable circumstances. Sometimes roots have a way of deceiving one. A root that at first seems worth saving may prove worthless under treatment and vice versa. The bite can only be proven by trial. Absorption of the ridges takes more or less time and the construction of the bridge should not be begun until the ridges are firm or else the saddles should be so made that they may be changed without interfering with the frame-work. Then, too, what may seem unimportant, but is really invaluable from an artistic viewpoint, the position, shade, size, and form of the teeth should be carefully studied so that as much of the patient's character may be reproduced faithfully as is possible. The teeth should not jar with the temperament or physical characteristics of the patient.

Clinics permit only of brief explanations, but I hope, nevertheless, that I have made clear to you the requisites and underlying principles necessary in an attachment for removable bridge work, without which neither comfort nor health of the roots can be assured. To preserve the health of the mouth and the longevity of the roots, these flexible attachments, giving retention by convergence and divergence to or from each other, and by adhesion, I have found approaching nearest to the ideal. To whomever it may concern, I simply wish to say in finishing, that this work is not mastered in one day nor yet two. It requires some time and experience to arrive at the point where one feels at home with it, but most of all it is necessary to bring to it an eager spirit and a desire to use it in every day's work, as an every day need, not as a last recourse in desperate cases. If one brings to it such a spirit, he will find that it spells success.

24 East Forty-eighth Street.

PERICEMENTAL ABSCESS ASSOCIATED WITH MILK-BORNE EPIDEMIC SEPTIC (STREPTOCOCCUS) SORE THROAT*

BY CLARENCE J. GRIEVES, D.D.S., BALTIMORE, MD.

IN ANY STUDY OF DISEASES of the human mouth, naso-pharynx and pharynx, the pathologist is at once confronted and often confused by the fact that the causes for such disease may be local or constitutional or both; the differentiation of these etiologic elements, particularly as far as the mouth is concerned, into a proper relation of cause and effect is far from complete; indeed, it is the real problem for the present and future set up for the dental profession.

The difficulty of the situation lies in the fact that the human mouth is but a modification of one end of the gastro-intestinal tract suited in the mammal to the maceration, if not the digestion, of food, all of which, together with the varied flora which inhabit the tract, passes through it as a vestibule. It is, therefore, not surprising to find the food detritus which lingers there inhabited by microbic types, indigenous to the intestine, as well as by the common mouth organisms and pathogenic visitors of variable virulence, lodged about the teeth and the gingivæ, just as they may be found in tonsillar and other crypts. Under ideal cultural conditions it is easy to conceive of damage to enamel, gingivus, alveolus or mucosa from some minute lesion, in the soft tissues and ultimately in the hard tissues; these lesions frequently result in an area of focal infection which, if allowed to become chronic, may spread its products body-wide.

This conception of local damage from purely local causes was the basis of all the early dental pathology, and it will continue to be an important factor, *though by no means the only factor*, in oral pathology so long as the mouth remains such a perfect culture area with such ready media. The idea maintained so long that there can exist a dental pathology in the sense of disease of tooth and its attachments any more than of the toe, skin, joint or any organ independent of, and differing in, its deductions from pathology of the whole body, is greatly to be deplored, for it has seriously interfered with the development of a general "pathological sense" in our profession, and we endorse heartily Hartzell's[1] statement that there can be but one pathology; however, it may be subdivided in the study of disease of the various tissues. So it was found in the investigation of such dental diseases as caries and excessive salivary calculus and their effects, that the causes are not at all local. That the mouth fluids in the normal protective, lubricating and digestive secretions, in any slight deviation from the normal, hardly appreciable and not to be confused with active disease, *may become excretions as well,* bearing many waste body products harmful to the gingivæ, alveolus and teeth. This abnormality has been definitely associated with certain diathetic states marked largely by defective metabolism, and it has been shown that the mixed saliva and its content may act on the teeth and alveolus locally, to great damage. At this juncture the oral pathologist is obliged to admit the constitutional element as potent, even if the effect be local in mouth disease, and he is immediately confounded by the mass and maze of physiologic chemistry concerning these waste products, entering into the consideration.

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*Read before the Ohio State Dental Society, December, 1913.

Further, as we study gingival lesions from simple trophic gingivitis through its many phases to pyorrhea alveolaris the purely local theory is soon found insufficient and untenable: for back of the local lesion, subject to infection from any or all of the pathogenic forms present, is found an insidious cause as intestinal putrefaction and fermentation, and certain states as the hyperacid diathesis known as arthritism, and many actual diseases in far-away body tissues producing a lowered local cell resistance in the mouth and local mouth lesions. There may thus be antipodal disease conditions occurring in the same mouth at different periods, which may overlap: the foci for infection or portal of entry in the mouth, the general disease manifestations elsewhere, or vice versa, the focal area elsewhere or a generally toxic state, and the disease manifestations localized in the gingivus. For instance, a dento-alveolar abscess produced primarily by pyogenic invasion through a deep carious cavity, entirely a local focal infection, producing general disease manifestations in a distant joint, muscle or endocardium, and yet we find the media making it possible for the carious organism to attack this same tooth, opening the root canal, may have been produced by an excess of fermentable carbohydrate in the saliva due to strictly constitutional and not local causes.

On the other hand, an incipient pyorrhea may occur and be the result not only of the local calcic deposits, which are indeed produced by constitutional causes, but by some defective metabolism or absorption of sapremic products from a disordered intestinal tract or of toxic absorption elsewhere from some distant focal area, affecting the vessel walls of the gingivus and alveolus; and, if the pyorrhea progress, the patient may suffer in turn from toxic absorption and ingestion of pus from the pockets with distant manifestations again in joint, muscle, heart and gastro-intestinal tract, creating a vicious cycle.

The necessity for the foregoing is obvious if we are to understand the etiology of the conditions about to be reported, for the pericemental abscesses under consideration were the exact obverse in modus of tissue invasion from the ordinary dento-alveolar periapical infection, which arises from pyogenic entrance of the alveolus via the root canal, while these, in many instances, occurred on teeth with vital pulps with no possibility of the organisms, no matter how virulent, reaching the focal area they created. The primary portal of entry was the pharyngeal wall and the infecting organisms and toxins were conveyed by the blood and lymph streams to certain susceptible areas in the peridental membrane. These abscesses, the histories of twenty-two of which are submitted for your consideration, occurred in patients suffering from an epidemic of streptococcus sore throat which occurred in Baltimore, January to March, 1912. The report herewith of three such epidemics occurring almost simultaneously in Boston, Chicago, and Baltimore is condensed from the elaborate work of Winslow,[6] Capps,[2] F. J. Davis and Rosenow,[5] Stokes, and Hachtel,[4] and Hamburger,[3] to whose papers you are referred.

As the outbreaks were remarkably alike in mode of infection, symptoms and fatalities, that of Baltimore, in which the writer was concerned in a dental way, may be taken as typal. Very few of those who patronized the infected dairy and a portion of whose diet comprised uncooked milk, escaped some phase of this infection. In fact, the line was rigidly drawn through families with milk drinkers, particularly children, as the major portion of the sufferers and fatalities. "The[3] malady was characterized by a sudden onset of high and irregular fever, inflammation of the fauces of varying degree, marked enlargement of the cervical glands, particularly in the case of children and, of course, much longer and attended with many more complications than the usual type of tonsilitis. There was no general glandular enlargement, the spleen and edges of the liver were frequently palpable beneath the costal margin. There was leukocytosis, but the differential count gave no noteworthy information." "The three[2] epidemics reveal a striking similarity in the complications: otitis media, peritonsillar abscess, erysipelas or some other form of skin eruption and nephritis were common sequels: arthritis, endocarditis, and myocarditis occurred in many cases. Pleurisy and pneumonia often ended in a fatal septicæmia. But a most dangerous and remarkable complication was peritonitis which was responsible for a great number of deaths."

Hamburger says,[3] "The results of cultures taken from patients' throats and of examinations of smears from inflammatory exudates complicating the disease were strikingly uniform. Streptococcus were always revealed --in nineteen cases the bacteriologic examination was undertaken and each time a streptococcus was obtained most often in a pure culture: in this way it was recovered not only from the fauces and otitis exudate, but from suppurating lymph nodes, from an abscess beneath the gastrocnemius muscle, from the peritoneum during laparotomy and from the blood of the femoral vein at autopsy. In the direct smears the organism often appears as an end to end diplococcus, intracellular in some specimens. Each pair seems surrounded by a halo, but in early specimens no envelope could be stained; subsequently, however, capsules were repeatedly, though not invariably, demonstrated in smears from inflammatory exudates. On culture media, however, the capsules were repeatedly, though not invariably, demonstrated in smears from inflammatory exudates. On culture media, however, the capsules are lost, but the streptococcus again appears encapsulated when recovered from the blood of a mouse which had been previously inoculated.”

“It is a Gramm positive organism. On agar it grows in dew-like droplets; it coagulates and acidifies milk and in this liquid it develops in long chains with end-to-end arrangement and sometimes in tetrad form. The organisms are not dissolved by bile salts. Blood agar plates show a hemolytic zone around individual colonies. In both the cocci cause uniform turbidity; inulin is not fermented and it is killed when heated to a temperature of 145 F. in milk.”

In all three cities a peculiar type of hemolytic capsulated streptococcus was secured from throat cultures or from peritoneal exudate of fatal cases. D. J. Davis[5] who compared cultures from each outbreak found them all practically identical, the differences being environmental, and he concludes that it is closely related to the ordinary streptococcus pyogenes.

Out of the ninety-two cases studied by Hamburger in the Baltimore epidemic about one-half were children, as might have been expected, and there were sixteen deaths, eleven of which were children, nearly all terminating in peritonitis and sepsis. As to the sources of contamination, in each instance a single dairy was at fault, and in Baltimore, a defect in the pasteurizing apparatus sent the raw streptococcus milk to the patrons for several weeks. It is not clear whether the mixed milk was infected from mastitis in one of the herd, or from sore throat in those who handled the milk, or infection of the udder and teat from streptococcus lesions on the hands of the milker. It is to be noted that local treatment, except surgery, when palpable pus areas existed, did no good, Hamburger saying, “No[3] advantage seemed to be derived from direct faucial medication and the general treatment did not vary from the usual management of febrile patients.” While tonsilitis was associated as one of the local results with this septic faucial condition, the tonsil was not the primary portal of entry for the organism, whatever may have been its secondary effect; this was proven by many children in the writer's practice, including his twelve-year-old son, whose tonsils have been most carefully enucleated and who suffered from the faucial symptoms and dangerous sequelæ, showing that the streptococcus made entry directly through the faucial membranes.

Many of the histories studied involve the tonsils as locally infected from the fauces, just as they do the mouth mucosa in ulcerative stomatitis, the tongue in glossitis, the esophagus in disphagia, the nasal membrane in rhinitis, and the periapical areas in the alveolus, where deep caries unfilled allowed invasion via the root canal, producing dento-alveolar abscess: an almost constant local result was infection of the middle ear via the Eustachian tubes in the form of otitis media and a usual local factor was the cervical adenitis often breaking down into buboe.

This feature of constant invasion of the cervical glands was of great diagnostic value, the rule being, the larger the swelling, indicating that the invasion had been localized and to a degree delayed, the less the risk of serious sequelæ; vice versa, the smaller neck swellings nearly always indicated rapid passage into the blood stream and terminal infections elsewhere, as erysipelas and other skin eruptions, nephritis, arthritis, endo- and myocarditis, septicæmia, pleurisy, pneumonia and peritonitis.

It is necessary that we should have a very clear understanding of the mode of infection of the alveolus that these cases may be understood, for in each instance it was no exception to the general rule for the rest of the body. *First,* locally on the carious molars of children, temporary and permanent, which had not been filled, the entry was via the root canal. The writer is well aware that this statement is open to challenge, for such canals are subject to dento-alveolar abscess from various pathogenic organism in health, but this feature was so constant in those suffering with sore throat as to be more than coincident. *Second,* on teeth of adults the pulps of which had been removed, the root well filled, frequently quiescent for years, periapical abscesses occurred from penetration of the faucial membrane by the organism conveyed thereto via the blood and lymph streams; all possibility of local invasion was here precluded by good caval and canal fillings; it is recognized that this point may be questioned, for such periapical abscesses do sporadically occur anyway: here, again, the percentage was too high in those affected with streptococcus throats to be questioned; indeed the writer believes that the occasional dento-alveolar abscess on a well-filled root, particularly if the vitality of the periapical cementum be damaged, generally results by the same method via the blood stream, nearly always with the naso-pharyngeal membrane as a portal as in a common cold.

Third, on the teeth of adults and only a small percentage of children, the pulps of which were vital, pericemental abscesses resulted: these were by far in greater ratio than the other methods and obviously could not have occurred except by passage of the streptococcus directly through the faucial membrane, thence by the blood stream to certain areas in the pericementum, *a type of strictly terminal infection.* In all, twenty-two cases were studied, in four of which periapical abscesses occurred by direct local infection via the canal ; in six, the same type arose on filled teeth via the blood stream; the remaining twelve were pericemental abscesses on vital teeth. It is to this latter class that we desire to call your attention, and so far as the writer's observations go these pericemental abscesses on vital teeth differed little from those so known for years and described by

Drs. Darby, D.D. Smith and Kirk, except that in this epidemic the percentage was very high. From the existing literature on the subject and what could be collected in full practice and infirmary experience, pericemental abscess is rare; it is significant, therefore, if twelve present in less than three months' private practice and in each instance the patient has had a septic sore throat.

The etiology of this lesion has been elaborated by Kirk in two papers, "Pericemental Abscess,"[7] and "The *Locus Minoris Resistentiae* in Pyorrhea Alveolaris,"[8] from which the writer considers himself most fortunate to submit this brief report. Dr. Kirk presents in the first paper his conclusions from the study of twenty cases, associating these lesions with pyorrhea or "the systemic condition which predisposed to pyorrhea of the malnutritional type." He shows quite clearly how infection carried via the blood stream can reach the peridental membrane and the resultant pus can be evacuated from under the gingivus and be a pyorrhea pocket or higher on the alveolar plate and be a pericemental abscess; in four cases, bacteriologic examination developed the pneumococcus; the specimens shown prove conclusively that in pericemental abscess the focus of inflammation is located interstitially in the pericementum, showing that it is intraperiosteal and not a subperiosteal abscess and that it does not raise the pericementum from the root like periapical abscess. Dr. Black's work on the epithelial elements in the peridental membrane is quoted and it is stated as probable that these cell rests are the nidus for infection carried thereto by the blood stream. Two very interesting points appear in the specimens shown, confirmed in the many studied by the writer: *First*, hypercementosis or hyperplasia of the cementum usually exists directly adjacent to the abscess tract in these as in almost every specimen; *second*, nearly all such lesions occur on molars and bicuspids, generally maloccluding or on teeth under heavy stress; *your essayist requests that you keep these facts in mind as they have an important bearing on the hypotheses to be presented later.*

In the second paper Dr. Kirk reaffirms his belief in the epithelial elements as a cause of pericemental abscess, quoting Black's report of direct microscopic observation made upon a section of an extracted tooth, with a portion of the alveolar wall and peridental membrane adhering in which he found these cells filled with micro-organisms. He concludes finally "that if these so-called glands of the peridental membrane are epithelial rests, remnants of embryonal tissue that has served its purpose, they are degenerative in character, and like all other degenerative tissues are lacking in vital resistance. They, therefore, are readily infected by pathogenic bacteria when the general resistive forces of the organs become lowered to a degree that permits bacterial invasion at any point." Relative to these epithelial elements, it is as yet an open question as to whether they are endothelial or epithelial.

If epithelial, they are the remains of the external layer of the enamel organ, imprisoned by the upward growth of the follicular walls, a theory strongly supported by Von Brun and having the sanction of comparative dental anatomists generally; they are also much smaller in man than in the early specimens studied and reported, which were those of the sheep, where the crown enamel patterns, as with all ruminants, are covered by a layer of superimposed cementum, the sheath of Herwig thus being enfolded by the follicular wall. If they are endothelial, glandular or lymphatic, it will have a most important bearing on possible disease invasion and its modus, for then they should be in direct communication with all lymph channels and much more liable to reflect, as do these linings of other joints, the toxic blood content; while if they be epithelial groups of embryonal epithelium, they are degenerative tissue isolated from the syncitium usual to epithelial nourishment, in the midst of the fibres of the peridental membrane, a white fibrous connective tissue organ, subject through life to great stress. Of whatever type, it is more than probable that if these isolated elements become the nidus for disease, and we believe they do, it is because of some small pressure trauma, incident to undue stress or malocclusion in the peridental membrane and this idea is confirmed by the frequent hyperplasia of the cementum adjacent to pericemental abscesses and the almost constant fact that teeth suffering from pericemental abscess malocclude or occlude excessively.

Finally, it can be said that few now consider these groups of cells as lymphatic—even Dr. Black is in doubt as to his first hypothesis, and it is denied by Broomell, Hopewell Smith, Von Brun and others; and none of these authorities will sanction the early statement that ducts from these epithelial elements open into the gingival space; so there can be no direct bacterial entrance from the mouth to produce disease in the peridental membrane locally. Excluding this local means of entry in pericemental abscess and admitting its probability in the open canal cases, its possibility, though rather remote, in teeth with roots and cavities carefully filled, it becomes a question as to the real portal, and there can be little doubt that it was through the faucial mucous membrane; for the mouth and throat were one culture bed of streptococcus, so virulent as to produce metastatic abscesses in distant tissues, followed by death, yet there is not one instance known to the writer of infective periostitis and necrosis of the maxillæ, mandible or nares, except where some open canal as the Eustachian tube or root of a tooth lead down into such; the mucous and submucous tissues proving a perfect protection against invasion. So this excludes the idea of direct entrance into the alveolus and peridental membrane and the organism seemed selective in its action on the faucial membranes. Aside from this epidemic it is worth considerable emphasis, particularly when these lesions occur in health, that the portals of entry for infective organisms which finally produce abscesses in the peridental membrane, either periapical when the root is well filled or pericemental when the pulp is vital, are the naso-pharyngeal walls and tonsils; penetration occurs by the pharynx and fauces, as in this epidemic, in common colds, sinusitis and pharyngitis, and most serious of all in influenza; by the tonsil, excluded in this epidemic, the patient otherwise in good health, the toxic elements arising from focal areas hidden in the crypts and marked locally by tonsilitis.

The tonsilitis following the rule in the cervical enlargements mentioned and applicable to infective adenitis generally and always when it is a portal, i. e., the greater the local disturbance in the tonsil, just running short of quinsy, the less the danger of toxic absorption; vice versa, the more quiet the tonsil, with little local fight, the greater the chance for invasion of the lymph channels and blood stream often producing arthritis and endocarditis. The writer is convinced from his study of infectious arthritis, when an alveolar focal infection is involed as a possible cause, that this is almost invariably the case; the common combination being tonsillar crypts, a chronic appendicitis, a sinusitis, and an abscessed root frequently well filled; it is obviously difficult to say which was primary and which secondary, in fact these cases are usually multiple, for the reasons just given. This brings up the important question of the local effect on the gingivæ and the prevalence of that class of gingival lesion grouped as pyorrhea alveolaris in the epidemic; this group was purposely avoided in the list of local lesions resulting, to accent the fact that it was conspicuous by its absence, or nearly so.

The twenty-two cases of abscess comprise less than one-half of the number seen during or after the attack had subsided sufficient for an office visit; other convalescents were carefully examined and questioned, and reported that there was nothing unusual about the gingivæ, a few cases of incipient gingivitis and stomatitis in mouths otherwise healthy were found, which cleared up immediately. Four old cases of true pyorrhea, two of which were retained by large splints and maintained in good shape by the prophylacticist, presented after the attack, with pus flowing from the usual pockets, one after three weeks' drainage of metastatic abscess on the thigh and the other a slight peritonitis. These would appear confirmatory of the direct invasion idea and of Simon's statement,[9] that any previous pyogenic invasion of a membrane will greatly assist, possibly by necrosis of the local tissues, the entry of the new pathogenic visitor, as in diphtheria preceded by oral sepsis. These four cases were certainly worse, but that has occurred in the writer's practice without septic sore throat, or any other perceptible cause for that matter, and in the one instance it might have resulted from pus absorption from the thigh abscess, although the writer believes these were true examples of direct invasion and it is significant that in but one of all these pyorrhea cases did pericemental abscess occur.

So far as this work goes, it is impossible to account for the absence of new cases of pyorrhea in the midst of a septic epidemic which produced such serious systemic results elsewhere as well as in the middle third of the pericementum, and but one of these abscesses opened into the mouth by way of gingivus, so the whole matter is somewhat obscured; the writer does not attempt to explain but simply states the fact; he may have been unfortunate in or misled by his observations; such as they are, the facts stand for future explanation, until questioned. The local treatment of these pericemental conditions was a failure; and absolute proof of the infecting organism, except in the three specimens, is equally vague; just as there was no specific treatment for the systemic attack, so there was no definite treatment, except surgery, for the dental lesions.

It must be realized in an epidemic of such unusual type, that it is more than half over before the average medical practitioner or the usual city health department awakes to its seriousness, for these throat types were hard to differentiate from tonsilitis with associated lymphadenitis and were often mistaken for grippe; the disease and the carrier had all to be worked out and only gradually became apparent; such in a small way obtained with mouth conditions, some cases were seen at the bedside and the abscesses immediately opened for fear of toxic absorption. So few were examined in the office until after the attack; a patient with 103 degrees temperature does not leave his bed to sit in a dental chair. These lesions were located lingually, buccally and interproximally, principally on molars and bicuspids, midway between apical and gingival, and just as in the cervical glandular involvement, there was little pus but much absorption of the alveolar walls with large fibroses, and considerable exudate; failing to realize anything unusual in the early cases, many were missed or the exudate contaminated; those opened made an uneventful recovery, after remaining loose for some time and the pulps in some are still vital; others suffered such loss of alveolus as to be chronically loose; these when extracted displayed plainly the abscesses, but they too had been contaminated by mouth fluids, as had those with fistulæ.

Only those who have tried know how difficult it is to obtain pure cultures from a mouth lesion. While exudate from the middle ear or peritoneal abscess is comparatively easy to obtain pure, the same conditions pertaining in the mouth are always liable to other oral infection. Those specimens collected by extraction, which operation was not done by the writer, were none so well defined as those presented by Dr. Kirk; they were often multiple, small, well-marked enlargements in the midst of the pericementum and two known definitely to be uncontaminated, showed, on bacteriologic examination, the encapsuled streptococcus the cause of the epidemic and common to exudate from the other metastases previously mentioned.

The periapical areas on filled roots when opened for drainage through the canal, with few exceptions, did not drain; there was not that prompt response to root canal medication obtained in the ordinary dento-alveolar abscess; this leads the writer to the conclusion that the majority of these were also hæmatogenic infections and this fact has been noted in the treatment of other periapical areas in the norm, when the portal was the pharynx, as in influenza; the streptococcus hemolyticus is not a particularly hardy organism, inert at 145 degrees F., or thorough pasteurization. Heat from the root dryer and germicides applied, should have controlled all such in root canals. The most striking feature about these abscesses was, as has been said, their prevalence on molars and bicuspids or whereever occlusal stress was greater, all things being equal, and the fact that these teeth were nearly all in malocclusion or tipping, an excessive amount of stress falling in the peridental membrane, as in second molars where the first was missing or in teeth standing alone.

The writer cannot but associate this excessive stress with these lesions, for there then is added to the normal sway of the healthy root an excessive movement, more nearly approaching that of the true joint and doing great harm, and it is his hypothesis that this accounts for the areas first weakened by this undue stress. The idea of stress is further corroborated by the fact that in Kirk's illustrations of specimens, in some of these, and in many others the writer has seen, there are nearly always hypercementoses involved in or near the pericemental lesions. This can mean but one of two things: either increased root strain or an effort at repair of some previous small lesion adjacent in the peridental membrane.

While the peridental tooth attachment is not comparable to other body joints, such as the diathroses having synovia and much motion, it is still a joint twixt bone and tooth, partaking more of the character of an amphiarthosis than synarthrosis, made by white fibrous tissue elements, allowing a certain amount of normal sway as proven by the wear on the proximal tooth facets, and it can be, and we believe is, frequently strained or damaged in areas resulting in a lame tooth for a day or more unnoticed by the patient, who transfers his occlusion to the other side. It would be most difficult to prove this assertion microscopically, so irregular are the peridental fibres, *but the writer contends that the small cemental hyperplasias so common on roots involved at least confirm it.* In this connection a report of the study of other body joints in 200 necropsies by Bietzke in the Pathology Institute of Berlin mentioned in editorial *Jour. Amer. Med. Assoc.*, Sept. 6th, 1913, entitled, "The Pathogenesis of Arthritis"[10] is so convincing as to be worth quoting.

"He[10] examined the great toe, knee, shoulder and hip joints and found but thirty-five out of the two hundred which did not have lesions in at least one of these joints; of the total number, there were six cases of arthritis deformans, and in sixteen, there was some evidence of gout, so that of one hundred and seventy-eight bodies of persons without typical joint disease, there were microscopically visible changes in the joints of one hundred and forty-three. The lesions varied from areas but a few millimeters in diameter, in which the cartilage was thinned and degenerated up to erosion changes destroying practically all the cartilage, associated with fibrotic alterations in the underlying bone; the conclusion seems warranted that they are the results of trauma of every day life, from which all persons suffer, and that they constitute a *locus minoris resistentiae* which determines the action of bacterial products. In these findings a ready explanation is seen of the great frequency of arthritic disease, and it becomes easy to understand why an infective process in the tonsils, prostate or gall bladder is so likely to cause trouble in remotely located joint surfaces." The relation of the patient's age and the changes produced thereby in the peridental membrane has an important bearing on this subject. Bietzke found 60 per cent. of these records of lesions in those from 20 to 40 years of age, 75 per cent. from 40 to 50 and 100 per cent. over 50 years of age; we all are familiar with the effect of early fibroid degeneration in the peridental membrane and the great increase in cemental hyperplasia as age advances; the thinning of the membrane and hardening or fatty degeneration of its fibres, and this is most significant when we also find about the same ratio of age related to pericemental abscess and also to pyorrhea, as found by Bietzke in the study of other joints.

Prior to the study of these pericemental abscesses, those seen by the writer occurred toward middle life, while in this epidemic where children under twelve years constituted over half of the victims of other sequellæ, out of the twelve cases reported, only two were children, and ten were adults over thirty. It also must not be forgotten that the pericementum in the child is thick with the same number of epithelial elements but open to seepage of nutritive tissue juices and well supplied with connective tissue cell elements for repair. There can be little doubt that the continued and increasing application of occlusal stress on the roots of any tooth, particularly if in a tilted relation, will place great strain on certain groups of fibres of the peridental membrane, while it will produce pressure on, if not absorption of, others including the attaching alveolus; it is conceivable that the nutrient supply of the epithelial elements buried in these fibres would be seriously disturbed; they then indeed might well be the areas of local lowered cell resistance, subject to any passing toxic element in the blood stream.

It is more than coincidence that so many X-ray films of crowns with high cusps, doing extra work, and the roots of vital molars bearing bridges should show resorption areas in the alveolar walls, adjacent to the root, not necessarily periapical nor associated with infection from the canal. These were formerly mistaken for minute abscesses, but the writer has examined too many, only to find no exudate nor pus, and knows them to be areas of bone resorption, due to increased strain; he is also equally sure that the pulps were vital by every test. The cemental hyperplasias which also appear apically on such roots are suggestive, and we cannot fail to associate them with middle life period when bridges are constructed; all these facts tend to the idea that increased stress has much to do with certain peridental abscesses which appear without cause on bridge work, the roots of which are known to be vital. Appreciating to the fullest extent the masticating values to be obtained by bridges, knowing the occlusal deficiencies of partial plates, from the study of a large number of films, the writer cannot but conclude that in those of the toxic habit the medical man is right in looking askance at bridge work, no matter how carefully constructed, if for no other reason than the creation of areas of lowered resistance on the roots bearing such and due directly to increased strain on the peridental fibres.

It has always appeared that there must be some mechanical or stress feature other than the purely constitutional (not that the constitutional is not sufficient cause) but in these cases the explanation seems a more reasonable etiologic conclusion, since it is definitely associated with both excessive occlusal stress and hyperplasia of cementum than the mere statement of the liability of these epithelial areas without such cause, for it must be recalled that the cell rests were just as isolated and vulnerable throughout the whole life of the patient up to the time of the attack; why then should not every tooth have become involved? One of the principal causes for the induction of pyorrhea given by the strict "localists" is malocclusion, and one of the principal causes for pericemental abscess and certain forms of pyorrhea given by Kirk and the "constitutionalists" is areas of lowered resistance in the peridental membrane; the writer believes that this idea of trauma from stress harmonizes both of these conflicting schools. And the prime thought of the paper, the reason for presenting these cases, is to accent the combination of some local damage or minute trauma as a nidus for oral disease, to which our attention rarely is called until the disease, diathesis or the constitutional vice becomes active; this was an epidemic with results sharp and short; defective diathesis and malnutrition will produce the same results but more slowly and insidiously: of these two extremes, the local results of the latter may prove the most difficult to control. The remaining ten cases seen in this epidemic should be of great interest because both groups, into which they can be divided, point lessons in the modus of infection. They were all periapical areas, apparently the ordinary alveolar abscess, but with differences as to the channels of invasion of the alveolus. Four occurred on roots that had never been treated or filled; as the carious cavities and root canals were open, it is recognized that infection might have happened at any time from the ordinary septic root canal content, but the interesting feature is that it did not, nor had these teeth ever abscessed, according to the patient, until the mouth was invaded from the faucial infection, and this we believe is an example of direct entrance of the streptococcus via the open canal to the alveolus; three arose on roots of temporary molars, which more than likely had open apices, and one apex in an adult was known to be open.

Several important points can here be considered with profit: *First*, the agents commonly mentioned as causing alveolar abscess are the products of saprophytic pulp decomposition and the common pyogenic organisms; in this instance no doubt the saprophyte had done its work, producing indurin, cadavirin, *et al.*, with no effect noticeable to the patient and no entrance by the pyogenic organisms until specific invasion occurred by the specific streptococcus. Granting that the abscesses were streptococcus, and we believe they were, it is confirmatory of the writer's ideal long held, that on filled roots, in which necrotic pulp remnants have been neglected, the products of the pulp decomposition do not necessarily infect the tissues but rather produce tissue necrosis, just as chemical agents might act when sterilized and injected into the tissues; croton oil, for instance, producing pus; the pyogenic infection being secondary from lowered resistance on the part of the periapical necrotic tissues, for isolated necrotic tissue is not necessarily infected tissue. *Second,* a smear from one of these cases uncontaminated, displayed the typical streptococcus, but it does not necessarily follow that the other three were direct infections, indeed it is probable that they illustrate the other mode of alveolar invasion the writer is anxious to present, for they may have arisen from a general lowering of vitality or malnutrition due to the disease, without the conveyance by the blood stream of any specific organism or toxin to the area; the local cell resistance of the periapical tissue hitherto maintained in health and thus reduced, lays it open to attack from the common pyogenic types always lying dormant in the root canal.

This brings up the whole question of periapical infection in much too broad a way to be here discussed. Very briefly, it may be said, in every dental practice, the point is raised almost daily as to whether the dental operation caused the periapical abscess or whether it was the inevitable result, no matter how fine the operation, of lowered cell resistance or vitality or of real disease elsewhere in the body, the toxic products of which reach the alveolus by hæmatogenous convey. Some definite answer must be made to this question, for it is uppermost in medical minds who have given unprejudiced thought to the great subject of oral sepsis. The dentist must have his etiology in hand, as far as our knowledge goes, he must be ready to say approximately as to whether the crown, bridge or filling and the root canal filling under it, comfortable for years, are responsible for abscess areas which frequently appear about such and which are so rightly condemned by all pathologists; he must know the three methods, previously mentioned, possible for bacterial invasion of the alveolus and must not accept the blame for focal pus areas on what he is sure are clean crowns, bridges, fillings, and root operations, just because they stand accused of causing oral sepsis.

On the other hand, he is culpable and criminal if he neglects, creates or fails to relieve such areas of lowered cell resistance, as for instance, stress producing vulnerable areas in the peridental membrane, or a necrotic cemental apex, which at any time may become the nidus for a focal infection. The toxic systemic diseases arising from absorption and ingestion of pus and tissue exudate, the result of blind and fistulous dento-alveolar abscess have been mentioned again and again by many writers. These sequellæ are so serious that even the exaggerated statements of certain extremists, who would have us believe that nearly every known disease is produced by such focal areas, have failed to obscure a sane understanding of the subject. Without quoting the bibliography which is long, it may be conservatively said, "That[12] after over five years' observation, with exceptional opportunities, of one hundred odd cases the writer has seen many forms of the results of focal infection arising from alveolar abscess and not one of these patients presented symptoms other than what might have been expected from slow pyogenic absorption. There was nothing unusual in the clinical picture, yet, 'the greater majority were very ill patients indeed, but it was difficult to place their illness in any class; it might be said to be more rheumatoid than arthritic, more muscle than joint involvement. The almost invariable history of muscle pain and minute glandular enlargement, particularly in the back of the neck; the muscular involvement about the joint, rather than a true arthritis in the joint; what the patient called neuritis; the effect on the blood, as of a low toxæmia or anæmia; the pasty complexion, loss of appetite, debility, night sweats, loss of body weight, occasionally low fever running for weeks, rarely more than one hundred degrees and subnormal frequently; the general malaise, which Pickerill aptly describes as "an increasing inability to do the usual normal day's work," the striking resemblance to incipient tuberculosis, actually misleading in some instances.'

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"These[12] were the symptoms of by far the majority of histories studied: a transitory myositis or neuritis accompanied by anæmia, in a word describes the bulk of them; the remainder can be equally divided into Rheumatoid and Infective Arthritis, Arthritis Deformans and Endocarditis, Toxic Anæmia and Neuritis. As illustrative of the fact that diseases resulting from dento-alveolar abscess are not so common as many authorities would have us believe—and this statement must not be misinterpreted as belittling the gravity of these conditions—it is to be noted that in five years of careful search, only a little over one hundred have been associated with systemic disease, out of the many under the writer's observation. No doubt Gilmer is correct in his statement that over twenty-five per cent. of all adults have alveolar abscesses, but we do not believe that it necessarily follows that even twenty-five per cent. of this large percentage will show specific systemic damage from such abscesses, bad though they may be, and filthy locally, for the elements protecting the gastro-intestinal tract, and the immunizing powers of the blood and tissues, must be recognized in this connection."

"The operator is to be censured who, through hurry or neglect, leaves necrotic pulp tissue at the apex, or infects canals, or does not sterilize or advance his root fillings as far as possible to the immediate apical opening, for he then produces these abscesses by direct invasion and it were far better for the patient if the dentist had not interfered. The writer is not one of those who can fill every root canal, nor does he believe every root canal can be filled, nor every periapical abscess cured, but in that event the operator should admit his limitations and the patient must be warned of the dangers arising from such; for instance, the doubtful buccal roots of upper molars and mesial roots of lower molars should be kept under X-ray survey after filled and carefully watched for secondary infection. This whole question of periapical alveolar abscess is involved in the comparative vitality of the periapical cementum, which has been discussed by the writer in greater detail than this period will allow in another paper[12] to which you are referred. It is enough to state that it has been proven that periapical abscesses rarely occur on the apices of roots, the cementum of which is vital, supported by the ordinarily careful root canal filling; that the periapical cementum is so often resorbed in minute areas and the surrounding alveolus greatly absorbed, denoting either excessive stress or the irritation arising from some necrotic tissue around carefully-filled roots, the pulps of which have been devitalized, as to establish the fact that the vitality of the cemental apex is of the greatest importance, and that it is frequently endangered by any method of pulp devitalization. Pulp devitalization will always be necessary so long as the patient's neglect allows pulp exposure and infection by caries; under these conditions it is the dentist's duty to do his best, and if there be any doubt of the result to inform the patient of the rick of secondary infection."

"Pulp capping and mummification are not to be considered for an instant, for they leave in the alveolus an ideal culture tube with the pyogenic organisms so attenuated by partial germicidal action as to enter the lymph channels without local reaction or pain, producing serious systemic disturbance elsewhere and are most reprehensible practice. Since these investigations were begun the writer has learned to be very careful of pulp devitalization at all times and to practice it as little as possible, particularly in patients of these toxic diatheses. This admission necessarily limits the field of our bridging operations in this type, for it is recognized that many bridge abutments cannot be correctly constructed except by devitalization; but better by far make a partial denture with all of its defects than to leave a necrotic pericemental apex, the nidus for future infection, all unknown to the patient, attached by a bridge which is comfortable, while retaining a blind periapical area."

Wherein lies the responsibility of the dentist in this connection? In the four cases with open carious cavities the burden rests entirely with the patient and is one of neglect; in the twelve cases of pericemental abscess, the stress of occlusion might have been relieved, had the patient seen the dentist, and in one case it was possibly produced by a bridge; in the six periapical areas on filled roots, two were caused by failure of the filling to reach an apex, easily accessible, resulting in small blind resorptive alveolar areas; a possible nidus for any hæmatogenic infection and undoubtedly the fault of the dentist. The other four were well filled, and if the vitality of the root apex was damaged in devitalization the dental operator was blameworthy in part, just as he was innocent if the apex became necrotic from abscesses, prior to his operating.

The writer believes there is no known method of pulp devitalization which will not in degree affect the vitality of the pericemental apex, and he would resent any criticism from his medical confrere, implying that susceptible areas had been thereby wantonly created, if his conscience was clear as to the after root-work and he had done his best. These four periapical cases were just as inevitable, under the conditions, as the ten pericemental cases; *but the fact that alveolar infections may so arise on well-filled teeth from toxic convey by the blood stream, must not be used as an excuse for slovenly root canal methods, where the best technic is never good enough, and that threadbare explanation of post-operative infection, "You have caught cold in that tooth," so often made to the patient, is worn out.*

In this epidemic which scattered terminal infections all over the body, it might be critically said that failure of any and all operations was excusable and that these abscesses might have resulted on healthy teeth; this we cannot entertain for a moment, for the reason that all operations did not fail, nor were all teeth involved; in each instance there existed some weakened local area; it is admitted that the best and most conscientious dental methods will produce these weak spots occasionally, for perfection in root surgery, as in all surgery, is made impossible by the anatomy of the parts. Such conditions, however, are exceptional, sufficient time and effort expended will nearly always bring their reward in a clean operation with no dental "post mortem," unless the toxic diatheses pre-exist. Finally, we believe the greatest vindication of clean dentistry lies *in the operator's knowledge of all the paths by which after-infection may reach his work;* he can then intelligently caution the patient, if there be a doubt, and refuse absolutely to accept any responsibility. With this knowledge he may stoutly maintain his position in consultation, when he knows his work to be clean; and he may frankly and without apology admit that every tooth cannot be saved, every pulp successfully devitalized and removed and every abscess permanently cured; with a thorough understanding of the dangerous sequellæ arising from all alveolar infections, after he has expeditiously exhausted every method known to our science in relief of the toxic dental nidus, he may also resort to extraction with no apologies.

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DISCUSSION

Dr. F. H. Skinner, Chicago: First, I want to compliment Dr. Grieves on the thoroughness with which he has made the observations from which he has drawn his conclusions. Work of this kind is of the greatest value to both the medical and dental professions and is, as he says, the real problem for the dental profession to solve.

It takes long hours of study to prepare a person for even starting original investigation, and then, a great sacrifice of valuable time and expense is necessary to collect data and cultures and carry on the laboratory work. The paper, itself, is a report of circumstances which actually took place, so, of course, there is nothing to question or criticise regarding that.

The question of body resistance to micro-organisms and infection is a broad one and is open to discussion at all times. While in the main, I believe Dr. Grieves' deductions are beyond dispute, he has introduced some collateral ideas which are at least open to discussion.

Some of his suggestions I want to emphasize and with some I want to differ. That the mouth is an ideal incubator is beyond dispute, and if it were not for the high resisting power of the mucous membrane, and gum tissues especially, it would be in a constant state of suppuration. There can be but one pathology for the human anatomy. The M.D.'s should know more of our subject and we should know more of theirs, and then, each practice our own specialty, but with a fuller, broader knowledge of each other's field.

I fully agree with the Doctor when he says we should have knowledge of the parts in which we are working and the methods in which they become infected. Permit me to quote from Dr. Grieves' paper:

''Further, as we study gingival lesions from simply trophic gingivitis through the many phases to pyorrhea alveolaris, the purely local theory is soon found insufficient and untenable, for back of the local lesion, subject to infection from any or all of the pathogenic forms present, is found an insidious cause, as intestinal putrefaction and fermentation, certain statis, as autointoxication, the hyperacid diathesis known as arthritis and many actual diseases in far-away body tissues producing a lowered local cell resistance in the mouth and local mouth lesions.''

I don't believe there ever was a case of simple gingivitis or pyorrhea in which there was not a local irritant of some nature, and one of the greatest problems for dentists is to learn to recognize and how to remove that which will produce local irritation. On the other hand, the lower the vital resistance, the less irritation it will take to produce inflammation, but if there is no local irritant on the teeth, gingivitis and pyorrhea will not develop, even though vitality is below par. This does not refer to an abscess, which may start in any part of the body, and I do not mean that stomatitis, glossitis, etc., cannot develop in what we call a clean mouth, but pyorrhea can be prevented by proper local care. Why couldn't the otitis media, which Dr. Grieves claims was caused by infection through the internal auditory meatus, have come from the blood stream as well as the periapical abscess? The blood all goes through the lungs and liver, making two big filters, which should, and usually do, catch any stray colonies of bacteria, and, it is my opinion, in spite of the authorities quoted by the essayist to the effect that "Infection of the peridental tissues cannot take place except through the blood stream or a direct opening," that such infection does take place just the same.

When conditions are normal, the mucous membrane of the nose, mouth and throat has a high resistance against bacterial invasion, but let any irritant be placed there, and these tissues soon become a prey to any of the pus-producing bacteria. The nasal secretions, normally, are mildly antiseptic and the mucous membrane of high resisting power. This takes care of infection in the air which is constantly passing through the nose.

Recently, a boy pushed a clean, small pebble up into his nose and lost it. For a few days everything was all right. Then, the pressure on the Schneiderian membrane caused a lower vitality, inflammation set in and was followed, later, by a profuse flow of pus. The clean, washed pebble from the pile of gravel was fully as clean as the air the boy was constantly breathing, but its irritation of the tissues by slight pressure so lowered the vitality that under the same amount of infection, which, before, was harmless, now caused a marked suppuration and would have been followed by necrosis, if the irritating body had not been removed. But taking out the foreign body in time was all that was necesary to cure the case, showing the recuperating power of the tissues when given a chance.

The gingival tissues, normally, have a high resistance, but any local irritant, such as soft accumulations, some so minute as to be invisible only by staining, or calcic deposits, crown bands and fillings, has a tendency to lower the tone of the dental ligaments, and when the dental ligaments and gingiva have lost their tone, the gum tissues are as much of a portal of entrance for bacteria as the nose and throat are.

On page 129 of Dr. E. S. Talbot's "Interstitial Gingivitis," is shown a microphotograph, by Zeiss, of a beautifully-mounted cross-section of a portion of the tooth, process and gingival tissues in which several ducts or crypts appear in the inner wall of the gingivus.

The theory is advanced, that, by ameboid movement, phagocytes, especially the polymorphonuclear neutrophils, have the power of passing through the walls of the crypts of the tonsils, attack or envelop pathogenic bacteria and pass back into the tissue. If the digestive power of the leukocytes is sufficient to take care of the bacteria, all well and good, but if the leukocytes die, a nest or culture of infectious bacteria is started, which may localize there, or is taken by the blood and lymph stream to the nearest point of less resisting power and there propagates and trouble follows. The mouths of most patients, who have not been under constant oral prophylaxis, show a condition of the gingivus similar to that shown in the pictures presented by Dr. Talbot, and it is my belief, that, with a mouth and throat full of streptococcus, a portal through these gingival crypts to a focal point in the pericemental membrane would be more likely to be the source of infection for a pericemental abscess than through the blood stream.

I do not mean to ignore Dr. Grieves' findings, but I think he has overlooked and denied one of the main portals for bacterial invasion. The X-ray shows few perfect root fillings, and even though the pulp is all removed and the root canal is hermetically sealed, the contents of the dental tubuli are a semi-serous organic fluid, which, sooner or later, is bound to decompose and form poisonous gases, which must find an exit, and they must pass out into the pericemental tissues. Try peroxid of hydrogen, 25 per cent. Hard layer not perfect barrier.

It is my belief that the tissue surrounding any tooth of which the root has been filled for a year or two is apt to be in a state of lowered vitality from these gases. With the Dunlop method, borated oxygen gas cannot be made to penetrate healthy tissue, but so far, I have never failed to find a direct connection between the inner wall of the gingivus and the peridental tissues surrounding any tooth where there is gingivitis, pyorrhea, or in which the root canals have been filled for five years or over.

That the four cases having pyorrhea were worse during the streptococcus epidemic is not to be wondered at. Nature is always doing all she can to fight disease, and in any sudden attack, such as this epidemic, she wouldn't have time to build up a sufficient number of antibodies to combat the sudden invasion of all of the pus-producing bacteria, and a lowering of body tone is, invariably, the result.

The more virulent the disease, the harder Nature fights to ward it off. This is very nicely illustrated by Dr. Grieves where he says: "The more swelling there was in the cervical glands, the less systemic effect and vice versa."

All acute inflammations are a natural process of Nature to save the body from deeper septic infection. Malocclusion produces a predisposition to infection in the peridental membrane, and the emphasis laid on the necessity of grinding down high cusps, whether it be on natural or artificial crowns, should make every one hearing this paper go home with a determination to watch more closely in the future for this condition.

The study of a plaster model made from a modeling compound bite is usually of great value in locating the places which need relieving. Malocclusion always occurs when a single tooth is lost and the other teeth tip in to fill the space. This is so frequently seen where the first permanent molar has been lost. Where the occlusion will not hold the teeth in place, a little fixed bridge should be put in to retain the teeth in their upright position. This, of course, brings the work of three crowns on two roots, but I think two good sound roots held in the right position, before tipping has started, will support three crowns longer and better than a tilted root will support its own.

Regarding trouble not occurring through open canals previous to septic infection in this epidemic, Nature was able to take care of the infection, but under this influx of streptococcus, her fighting forces were pretty well exhausted, and the infection, which at that time caused the acute condition, was just as liable to have been local as to have been carried there by the blood stream.

I do not like the essayist's suggestion of using partial plates to supply a missing tooth or two. A suction plate is made by relieving a little in the vault of the palate and producing a close adaptation at the borders of the plate. This keeps up a constant pressure on the tissues just lingual to the remaining teeth, thus impairing circulation, and impaired circulation means a lowering of the resisting power of the tissue cells, which, in 99 per cent. of the cases, leads to an invasion of infecting organisms followed by inflammation and pyorrhea alveolaris. Short bridges can be made, and there are no cases in which some form of attachment cannot be made on vital teeth. I do not hesitate to crown a vital tooth. A great many molars and bicuspids can be cut down so as to get good fitting bands, pin inlays, Beebe two step, Alexander and Carmichael attachments, or porcelain jacket crowns, without the use of any anesthetic, but where necessary, N_2O and O, administered in sufficient quantity to keep a patient in the analgesic stage, can be used. To prevent shock to the pulp from over-heating, all cutting down of vital teeth should be done under a stream of cool water or compressed air with a pressure of from 25 to 35 pounds. Otherwise, pulps are liable to die from the disturbance caused by stones or burs getting too hot.

Recently, I had the pleasure of working for a lady for whom Dr. G. V. Black, twenty two years ago, had placed on a lower second molar, with vital pulp, as pretty-fitting a gold crown as I ever saw. The tooth was perfectly prepared and the crown as accurately fitted as though the work had been done out of the mouth, and the pulp was as healthy as one would wish to see.

I believe, thoroughly, in keeping pulps alive, whenever possible, but every practitioner of dentistry has cases come to him in which it is necessary to devitalize the pulps of teeth. This procedure we should carry out with great care, and, as the Doctor says, the patients should be informed that trouble is liable to start in a devitalized tooth, but that through their ignorance or carelessness, or through some accident, conditions have arisen in the correction of which it is necessary to devitalize, and that, in your judgment, devitalization is the lesser evil.

All large or extensive cases should be made in some form of removable bridge work, and for this class of work it is necessary to devitalize. Then, the abutments should be cut off even with the gums and the stress from the opposite occluding teeth equalized between a saddle resting on gum tissue and a part of the bridge extending over onto the abutments. All saddles should be far enough from the abutments so as not to cause pressure on the soft tissues near the teeth used for abutments, for this kind of pressure always causes inflammation. The abutments should be relieved of all lateral strain by the use of a lingual bar in lower cases, and an arch bar in upper cases.

I would far rather take a chance with a few devitalized teeth, with well-filled roots, than with the sore, inflamed suppurating gums which, invariably, follow the wearing of a partial suction plate.

I realize there are many unsettled questions brought up in this paper and know that their discussion cannot help but be of great value to the public as well as to the professional man. In the points upon which I have differed with the essayist, I have given my own opinions, based upon clinical experience and a very limited scientific knowledge of the subject, and hope the time will come when we all shall be enlightened sufficiently to enable us to take care of all of these pathological conditions, but better yet would it be if we could so educate the public and profession that we could all work in harmony in preventive measures, and thus eliminate at least 75 per cent. of the pathological conditions with which we are now trying to contend.

Permit me to read a quotation from a recent discussion on the subject of "Blood-Borne Infection," by R. H. Brown, of Chicago:

"The question as to whether a given infection is blood-borne or local, from continuity of tissue, is a very large question that is extremely difficult to answer off-hand. This much must be said, that in all of the infectious diseases common everywhere, the vast majority of inflammations resulting are found where it is easy to determine a local source, as in rhinitis, otitis, stomatitis, tonsilitis, bronchitis and pneumonitis. In all of these conditions, it is plain to everyone that the infection can most easily be carried locally. It is also a well known fact that following the inflammation of these different parts, it is common to have little boils or abscesses appear in the skin, or to have so-called cold sores at the junction of the skin and mucous membrane, as the lips or the edge of the nose. Here, many claim that the infection comes from the germ itself being actually carried to the part by the blood, but it must be borne in mind that it is not at all necessary that the infection be thus borne, as in these parts there are glands running deeply into the skin which have been proven, conclusively, to be very often infected, and this infection can be lighted up easily during the general toxemia which occurs in all of these infectious troubles.

"While I do not deny the possibility of infection being carried through the blood, I contend that it is extremely uncommon and usually found in the serious cases of septicemia. My contention is this, that if infection is apparently blood-borne, it would be natural to expect the vast majority of the inflammations, so caused, to be located first in the lungs, where all of the systemic blood must pass through the lung capillaries before going through the system again, or, to a much less extent, in the liver, and, to a still less extent, in the kidneys, where in each case the blood must pass through capillaries before continuing its course.

"It is a clinical fact that these little abscesses of the lungs, the liver and the kidneys are extremely uncommon in infection, seldom found outside of the fatal cases. When germs can be found under the microscope in the blood, or cultivated from the blood in laboratory, the case is usually considered an incurable one. When the streptococci are found in the spinal fluid, which is nothing but serum, no surgeon will give the slightest hope. The case is one of streptococcic spinal meningitis, and the mortality is placed at 100 per cent.

"It would seem to me that it is not necessary to consider these infections, of which we speak, those of the borders of the skin and mucous membrane, such as the lip and the edge of the nose, and, in the same way, those of the gingival margins or that immediate neighborhood, to be caused from blood-borne infection, as there is every reason to consider that the infection can be carried down from the edges of the gum. It has been clearly shown, in many articles, that there is a multitude of irritating causes, some of which have been mentioned, producing a lowered resistance in these regions. When such a lowered resistance exists, the infection can travel, easily, by direct continuity of tissue, from the mouth, throat or nose, to form abscesses, without its being necessary to consider that these will be of blood-borne origin. I will then consider it would be an extremely rare thing that abscesses of these parts under consideration would be caused in any other way than by local infection, presumably focused at a certain point, on account of some of the various causes of lowering of local resistance."

Dr. N. S. Hoff, Ann Arbor, Mich.: The papers of Drs. Grieves and Hartzell are full of material for earnest consideration, and they are most timely, in view of the fact that the work of the dental surgeon is at this time under suspicion by the medical profession, and some severe criticism has been made upon this department of our work by certain medical and dental writers. How deserving the profession in general may be of this censure we are not quite certain; but we are assured that the better class of dentists keep in mind in all their surgery the fundamental principles of adequate asepsis. We are aware also of the deplorable fact that there is not that wide-spread knowledge of the fundamentals of general and special pathology which makes keen and definite diagnosis the rule of action in technical and therapeutic dental practice. There are many intelligent and conscientious practitioners who can be trusted to uphold our highest ideals, but we regret to acknowledge that the majority of our profession prefer the ease and comfort of an habitual and perfunctory procedure to the more critical and laborious habit of knowing the exact situation before undertaking treatment. Pathology in its broad and inclusive sense has not been taught in our schools, and our literature has never given it the same place that it has given to technical details.

These papers are unusual, and probably will not greatly interest the technical workers of our profession, and while they may never become classics, they call our attention strongly to a situation that is as vital to the best interests of dental practice as the more popular cast inlay, or silicate cement filling propaganda which have absorbed so much of our thought and time during the past five years. In fact, this matter is in some respects paramount. Of what use will be all this beautiful technic, if we have unstable and unsanitary foundations upon which to construct our famous crowns and bridges?

We fear that the title which Dr. Grieves has given his paper may in a way obscure the important truths which he endeavors to bring to our attention, and his elaborate treatment will require our most alert attention that we may see the facts which he has detailed in their practical relations to our therapeutic work. He makes no claim to a great discovery, but modestly recounts the experience through which he passed, which was indeed remarkable in itself. We are really grateful that a man so alert and capable was on the ground, and had the tact and skill to handle so important a problem successfully; and that he was wise enough to make these accurate observations which will furnish us most valuable data for present and future consideration. It was indeed a remarkable experience, for instance, to encounter within a few weeks, twenty-two pericemental abscesses; most of us will not encounter one-half as many in a life's practice. Specialists in Oral Prophylaxis and Pyorrhea Alveolaris observe more of these conditions than the general practitioners, but they do not run in shoals as they did during this epidemic in Baltimore. Nevertheless, it is possible that for lack of accurate observation, we may be passing over equally serious and menacing pathologic conditions without knowing that they exist, because of their unusual environment and unobtrusive character.

The hypothesis which Dr. Grieves raises to account for this condition is logical, and even if untenable, because of our present lack of definite knowledge, it will serve admirably for a working basis—that is it will serve to explain the situation which he recites and give us ideas for therapeutic activity, until we shall have time to make a definite scientific research to prove or discredit the theory. It will doubtless be a long time before another similar clinical exhibit can be observed, but the essential elements of the condition can be determined by a well-conducted laboratory research. Incidentally, this is a strong argument for professional research laboratories, with a man always available to take up just such problems when the necessary material can be had for pursuing the research most advantageously.

Not being a scientific pathologist, I can not take exception to Dr. Grieves' conclusions. The clinical symptoms indicate general systemic pyemia, caused by the absorption of micro-organisms from the faucial region, which may not have passed directly into the venous tracts as there seems to have been no trauma or ulceration, and yet there was considerable enlargement of the cervical glands. With such extensive development of microbic material in the pharyngeal region it could easily pass into the stomach and intestines in such masses as not to be sterilized by the digestive juices, and be absorbed into the blood streams to be carried to every part of the body in such quantity and virulence as to infect any susceptible tissue in which it might find lodgment. The blood saturation may also occur from regional lymphatic absorption or direct invasion because of immediate contact of the tissues involved. The history as given precludes contagious infection and the results might warrant the assumption of blood saturation *primae viae*. If more time were involved there might have been infection through the degenerated peridental structures.

The theory that Dr. Grieves advances for the pericemental and apical abscesses can be easily harmonized with clinical experience; namely, the breaking down from infection of degenerate embryonic tissue, necrotic residua, scar tissue from root canal surgery, and fatigue of the peridental tissues from mal-occlusion. The fact noted that the same form of streptococcus predominating in the faucial and pharyngeal infection was found in the peridental abscesses, is a convincing proof of systemic or autogenous infection, in these cases at least. Why should we not have dental affections when any virulent general infection is present, and when conditions prevail which would favor them; and are they not liable to occur at any time of ill health? It may be that no such opportunity for so profound a systemic impression on the dental tissues may often occur; but is it not logical to believe that any disease that so completely attacks the general nutritive system and impairs the vital forces, especially so virulent a form of infection, and which thereby lowers the so-called *vis conservatrix*, will discover the weak and susceptible tissues of the tooth environment? Crown and bridge workers, orthodontists and pyorrhea surgeons can easily credit the suggestions advanced by Dr. Grieves, and understand how diseased or debilitated tissue would supply the conditions most favorable for local or cryptic infection, especially under the stress of an epidemic producing such pernicious systemic conditions. We hope this experience will enforce a more accurate and careful diagnosis of all suspicious oral infections.

We cordially endorse Dr. Grieves' suggestion that all operations tending to debilitate the root environment, if done at all, should be made in the most skillful manner and under approved aseptic conditions; that we avoid, whenever practicable, the extirpation of tooth pulps for the adaptation of crowns and bridges; that more careful study should be made of the power and direction of the masticating forces which necessarily subject the peridental tissues to abnormal and injurious exercises; all of which predispose and may sooner or later result in destructive pathologic sequelæ. In view of the facts brought out in this paper, would it not be a wise precautionary measure to skiagraph all suspected conditions, and possibly those which give no symptoms of even dormant affection, especially when there should appear an unaccountable systemic depression and there were oral conditions that might have etiologic relations? Incipient infections could, if discovered early enough, be aborted, or at least much suffering or discomfort be prevented, by timely interference.

I desire, personally, to thank Dr. Grieves for this timely and most commendable paper, which should stimulate us to a more conservative treatment of the tissues under consideration; and this experience should create a new interest in the study of pathology in its broader relations, as we have seen that there can be no such thing as special or dental pathology, because the human body, though made up of many organs, and complicated tissues is, after all, a systematized unit and must be known and treated as such.

Dr. M. H. Fletcher, Cincinnati: It is a matter of gratification to hear the essayist advocate the "Common law of general pathology, viz., that there is no law of pathology of the eye, ear, or mouth, but a general law which applies to all tissues."

He is certainly right when he says: "The special pathology idea for different parts of the body has seriously interfered with the development of a general pathological sense in our profession." The use of the term pyorrhea alveolaris as now applied by the dental profession, I believe to be the greatest hindrance to a "general pathological sense," especially as to the diseases of the alveolar bone and gums and their sequelæ.

The essayist says: "The dentist must have his etiology in hand as far as our knowledge goes." Let us apply this to the essayist's own words; for instance, he uses the word hematogenesis (which means the production of blood) as follows: "The toxic products of which reach the alveolus by hematogenesis," etc. Hematogenic and hematogenous, conveys the idea intended, but the term blood-carrier is simpler. The misuse of the word is clearly an error, although it is thus used throughout his essay.

To quote from the same paragraph he says: "Some definite answer must be made to this question for it is uppermost in medical minds who have given unprejudiced thought to the great subject, oral sepsis." If we are to be considered pathologists in our own line, by these "medical minds," let us avoid such errors and others which follow. He says: "Farther, as we study gingival lesions from simple trophic gingivitis, through the many phases to pyorrhea alveolaris, the purely local theory is soon found insufficient and untenable, far back of the local lesion, subject to infection from any or all of the pathogenic forms present, is found an insidious cause as intestinal putrefaction and fermentation, certain status as auto-intoxication, the hyperacid diathesis known as arthritism and many actual diseases in far-away body tissues producing a lowered local cell resistance in the mouth and local mouth lesions * * *.

"At this juncture the oral pathologist is obliged to admit the constitutional element as potent, even if the effect be local in mouth disease, and he is immediately confounded by the mass and maze of physiologic chemistry concerning these waste products, entering into the consideration."

The above wording is not clear, but I take the author to mean that the pathological systemic conditions he mentions produce "A lowered local cell resistance in the mouth and local mouth lesions," and that the "local theory" as to the etiology of the disease is untenable, this theory being "confounded by a mass and maze of physiologic chemistry concerning these waste products." The essayist must mean pathologic chemistry, since he is speaking of pathologic conditions. The "mass and maze" and uncertainty suggested, easily clears up when the real conditions are comprehended. The etiology and pathology is then perfectly plain to "medical minds" as well as to others.

No one denies the ever-present and irritating effects of calcareous deposits at the gum margin, but I believe very few realize how universally present they are and how potent a factor they are in the etiology of mouth diseases. The first break in the gum margin is the first and greatest etiologic factor in producing inflammation of the thin alveolar border. Once the break is made in this position, numerous varieties of germs may find here the most perfect environment for proliferation. By the demand of these germs for food, and the action of their end-products on the bone the latter is continuously destroyed. Thus the periosteum both inside the socket and outside of it is left without its source of life and must die if it is not already destroyed by germs. At this stage any or all of the pus-producing germs find here a most suitable home. When this occurs, even to a limited degree, we have suppurative alveolitis, that is, pus flowing from the sockets (Pyorrhea Alveolaris).

Another phase of the disease, which is decidedly more common, is when the calcareous deposits are more profuse and more adherent to the teeth, always impinging against the gums and bone, inducing inflammation of these tissues and resulting in their slow destruction. This condition may continue for years without apparent suppuration. A lesion of any kind is prone to infection at any moment. Thus when a systemic malignant infection is present, such as the ''milk-borne sore throat'' described by the essayist, resistance to disease is not only lowered in local lesions, but these places about the teeth form veritable hotbeds for the growth and distribution of all varieties of disease germs. Not alone during epidemics, but many, many times more without them.

In this way the ''vicious circle'' is established, the systemic infection encouraging and assisting the local lesions which were the great etiological factor in its beginning. In turn these local hotbeds furnish all the varieties and quantities of germs necessary to produce the long list of functional and organic diseases and their sequelæ.

There seems to be no physiologic nor pathologic reason why a general systemic infection or disorder of any kind should attack the gums or alveolar bone any sooner than it would any other locality, assuming that all are normal and healthy.

The idea that the alveolar bone is transitory and unstable as advocated by some, I believe to be erroneous if the race, as a whole, is taken into consideration. The gums and bone about the teeth of all animals in their normal state show no tendency to alveolitis, unless they be domesticated. The disease does not appear in man until he has reached the stage of building fires and preparing his food. The disease will show in animals under similar preparation of food.

Under this preparation and softening of food, the stimulation to the development of connective tissue in the gum margin is lacking. Hence, any slight irritation to the gum margin results in a lesion which soon becomes chronic. This is in consequence of the lack of a well-developed welt of connective tissue about the teeth and its copious blood supply. This condition shows in all normal and healthy animals and is necessary for the most perfect protection. If this perfectly normal and healthy condition of the gums obtained during milk-borne or any other epidemic, the gums and sockets in man would not suffer more than any other part of the body.

The condition of individuals weakened by civilization, or a few generations of civilization, does not establish a law for the species. This is shown by the fact that the proper attention to weakened organs or functions in weaklings, in time, restores such to almost normal physical condition. The weakened condition of the mouth tissue is not so much from inheritance as it is from ignorant neglect from childhood on. It certainly is up to the profession having the mouth as its field of labor, to teach these simple laws to the people, viz: That the proper use of hard brushes and flat wood toothpicks on the gums will develop in them the normal welt of connective tissue about the teeth like it is produced in animals by the continual mastication of rough foods. This is the greatest possible protection against Oral Sepsis and its resultant disorders.

As stated, it is not at all necessary that there be a general systemic infection or disorder in order that the rapid destruction of the alveolar process may proceed. Constitutional danger from Oral Sepsis is the rule, the reverse is the exception. Local infection may easily reach that malignant stage whereby systemic infection may progress to septicemia and death, or the health may be undermined to invalidism from impairment of any or all of the functions of the body. Many times functional and organic destruction may occur in distant parts of the body from Oral Sepsis, started from simple gum lesions.

Here I would cite the essayist to Dr. William Hunter's and others' researches on the far-reaching effects of "Oral Sepsis." I believe Dr. Hunter's position is right and in perfect accord with the laws of pathology. I know of no law of pathology which reverses the process and causes diseases of the eye, ear, mouth, or any other portion of the body unless there may be found in such locality an already exciting lesion. It must be remembered that, taking the human race as a whole, Oral Sepsis is almost universal.

Septicemia in some stage, as in the epidemic cited by the essayist, is a condition under which I believe the blood carries infection to these mouth lesions. It may be true in syphilitic and tubercular infection, but I think not in the eruptive diseases or typhoid.

It fell to my lot not long ago to be called to a case of Septicemia which had reached the pyemic stage. This case had nearly all the symptoms described by the essayist aside from the history of the epidemic sore throat.

The patient was a man of 38. Two weeks after a pulmonary hemorrhage or two he began to develop local pus collections about the lower wisdom teeth, both of which were only partly erupted. There was more or less pus about all the other lower teeth, but more markedly about the two lower canines. The upper teeth were not affected in the same way. As far as could be seen from bedside examination, there was no visible calcareous deposits, but there was a marked recession of all the gums from bacterial invasion.

Incisions were made on each cheek opposite the lower third molars. Three ounces of pus discharged from the left side and two from the right. This, in connection with subcutaneous injections of ten cubic centimeters of anti-streptococcic serum twenty-four hours apart, reduced the temperature in sixty hours from 102 to almost normal.

A month later the attending surgeon found it necessary to remove the three lower molars on the left side and the surrounding bone and the lower third molar and some dying bone on the right side, also one of the lower canines. At the present time the case is practically well. This was a true case of Suppurative Alveolitis (Pyorrhea Alveolaris) from local infection by Staphylococci and Streptococci, producing marked and dangerous constitutional conditions and corresponds in its local effects to those reported by the essayist.

The point in mind is to show that these lesions of gums and alveolus, be they ever so slight, are so universally present that they are not only a danger during epidemics, but they are always a danger. They are liable to become infected and dangerous to life as septicemia as well as by many other systemic disorders. That the gums and bone about the teeth, although seemingly well to the layman, on critical examination by the practiced eye show lesions about almost every tooth either in gums or bone, or both.

The essayist's description of exaggerated suppuration about dead teeth and especially where root canals had not been perfectly filled, shows how natural it is for points of least resistance to take on active septic conditions, especially when the blood stream is charged with infective germs. This is a timely and important warning.

The essayist reports instances in which he thought suppuration was found about the apices of healthy live teeth. If suppuration appeared about such teeth it must have started from the gingival margin, since a healthy pulp would not suppurate under epidemic conditions any more readily than healthy periosteum of mucous membrane.

The paper, as a whole, is very interesting and instructive and I wish more of us might be prepared to take an interest in reporting such conditions when they appear within our jurisdiction.

DR. GRIEVES (closing): I am greatly pleased with the discussion and the interest my paper has awakened and I wish to thank those, speaking, for their courtesy to me.

In answer first, to Dr. Skinner, pyorrheal conditions were not my part of this symposium but Dr. Hartzell's, and only such as were of use in illustrating the point, I worked into my own paper. I will say though, that if the group of gingival lesions we call pyorrhea are all the result of local irritation from salivary calculus and soft deposits, what Dr. Skinner calls irritants, then all people should have pyorrhea, as all mouths normally are dirty and have more or less of such deposits particularly on the lower incisor group. We have been told by the pyorrhea specialist that everybody has it, yet statistics show that it keeps over 40,000 dentists busy attending but about 11,000,000 of our population and the other eighty odd million consult the dentist for no service but extraction. Have all of these people pyorrhea? They certainly have all the local filth which is said to produce it.

In my opinion, the local filth deposit becomes an irritant only when, *first,* the filth becomes a media of such nutritive value to the pyogenic cocci as to raise their virulence to such a point as to produce local tissue invasions, and, *second,* the deposits do harm only when so excessive as to invade the gingival attachment and the soft tissues become necrotic or lowered in local cell resistance and when the general cell resistance is lowered through constitutional causes any or all of these cocci may produce lesions, so out of the eighty million, all with teeth filthy and never cleaned by the dentist, only those who were constitutionally so predisposed from any cause would have gingival lesions.

As to the so-called ducts leading into the alveolus, this occurs only in diseased conditions, while it is possible, as Dr. Skinner says, with the Dunlop apparatus to find openings which, under gas pressure, lead directly into the alveolus in mouths affected by dento-alveolar abscess and pyorrhea; these are areas of bone damage and absorption and only prove that Talbot's etiology of pyorrhea is correct when he shows that the disease is largely an endarteritis producing primarily alveolar absorption. This same gas under pressure will not produce inflation of a normal alveolus nor raise a healthy periosteum from it and there are no normal openings leading into the peridental membrane. This fact was thoroughly discussed in the paper and you are referred, further, to the record work of Hopewell Smith, "Studies of the Jaws in Health and Disease," *Cosmos,* August, 1913.

"The four cases of pyorrhea," which were made worse, indeed, as Dr. Skinner says, "are not to be wondered at;" the astonishing thing is that all having septic throats did not have pyorrhea; the elements for it were there, and this, in my mind, is but another argument for the predisposition of certain individuals and tissues to invasion from certain organisms. This was fully illustrated in the paper.

I am particularly pleased with Dr. Skinner's remarks on relieving the occlusal high cusping in great stress and malocclusion and agree with him heartily in his splinting and bridging ideas as also his attitude on the dental pulp, but he thoroughly misunderstands my remarks when he interprets *partial dentures* as *partial plates;* "partial dentures" is what I said. There are many such removable, neither plates nor fixed bridges, some of which the Doctor has mentioned and which I use freely in these cases.

As to the matter of many infections being hematogenous or blood-borne, I hardly think this as a general principle is discussable, for it is certainly accepted as an axiom by all pathologists; anyone who has seen a post-typhoid abscess opened, where the primary invasion was via Pyer's glands of the intestine or, as in the case quoted, a deep thigh abscess containing a teacup of pus with septic sore throat, with no previous local damage to the muscles as a nidus, would be convinced that the organism and its toxin or in symbiosis with some other pathogenic form, were blood-borne.

No one doubts the idea of a local portal of entry. There is a predisposition of certain tissues to be attacked and act as hosts for certain organisms, just as certain groups of organs and tissues are known to prepare anti-bodies against some distant invasion and supply such to the blood stream. The portal of entry in these cases was the fauces. Adami's and McRae's remarks are most convincing in this connection; they say: "It may be considered that every organism capable of local proliferation is theoretically capable of being found in the blood stream and that, in the case of organisms like the pyocci, their presence or absence is due to the numbers of them that escape at any given moment and the antagonistic power of the blood and tissues." All terminal infections, a large group of which can be produced experimentally by inoculation with the organism, are blood-borne as are many intoxications.

In answer to Dr. Fletcher, I fear he did not listen to the reading of the paper but discussed it from a poor copy sent him a month ago. The word "Hematogenesis" as used in that copy was found to be a typist's error and "Hematogenous" was the word substituted and read to you this afternoon. But I am rather sorry now that it was changed for the reason that you have heard Dr. Hartzell speak of Rosenow's wonderful work on the transmutation in the blood stream and in animal passage of the streptococci. I, too, have followed that work, and, according to the oxygen tension, there may be mucosus, veridans, hemolyticus or even pneumococcus as these may develop in the forming blood; so hematogenesis is not so bad after all.

Dr. Fletcher is rather stilted in his criticism of the use of the words "Physiologic Chemistry" as was applied in the paper to the difficult study of salivary analysis; now if the Doctor will stand in the laboratory with me and say which is a pathological saliva and shall be studied by pathologic chemistry and which is physiological saliva and be sent to the laboratory for physiological chemistry, then he has it, as the boys say, "all doped out," and we need spend no more money nor time on salivary analysis—we'll just send it all to Dr. Fletcher—that would be easy. So long as Dr. Fletcher does not discuss my paper, which was not on gingival lesions, as you would suppose from his remarks, but on blind pericemental abscesses and the epidemic which produced them, and as he is rather facetious as to my use of terms I might reply in kind by saying that "dying bone" applied to semi-necrotic bone areas is not exact, and, as for "suppurative alveolitis," some one has said that is suppuration of an "inflamed hole" it does not locate the lesion, for it might be the alveoli of a lung or a gland or elsewhere in the tissues and, further, it is reiterative.

I protest against the use in the case he cited of an "anti-streptococci serum" in this day of vaccines; it is doubtful practice to introduce the dangerous protein element present in serum therapy and I cannot understand, if as the Doctor says of the local infection, it was a mixed staphylo and streptococcal infection and he knew his organisms by cultures taken from the lesions, why he did not make autogenous vaccines and use those.

So I cite to Dr. Fletcher, as he cited Hunter to me. I have quoted Hunter myself on occasion and he has been rather over-quoted, a long series of articles appearing in the *Journal of The American Medical Association* of which the Doctor is a member, warning against the dangers of using these so-called "anti-streptococcal sera."

I thank Dr. Hoff for his kind words, I thank you all, and am sorry to have spoken at such length.

The purse is empty that is full of other men's money.

PROPHYLAXIS, ITS RELATION TO GENERAL PRACTICE*

BY DR. KING S. PERRY, PITTSBURG, PA.

PROPHYLAXIS IS DEFINED as preventive medicine. Oral Prophylaxis, preventive measures against oral diseases, preventive dentistry.

How many of us practice prophylaxis to the full extent of our ability? Not twenty-five per cent. of the profession; it is a question in my mind whether more than fifteen per cent. of the profession recognize pyorrhea when they see a case.

To give as an excuse for such indifference, for it is nothing else in the majority of instances, "that my people do not appreciate prophylactic measures," is due to a lack of effort on the part of the dentist to educate his patient. If we would take sufficient time to demonstrate the contact point, using one of the typodonts that are on the market, showing how the loss of one contact point will eventually destroy nature's nice arrangement of the whole mouth, destroying the efficiency and comfort in mastication, we would find no lack of interest. We all know that defective masticating apparatus renders impossible the proper preparation of the food for digestion, and contributes to the producing causes of malnutrition and pathological changes in function and structure of the stomach, intestines and associate organs. Let us pass this knowledge on to our patients.

I consider contact one of the most essential points in inserting a filling; lack of contact, either from faulty technic or loss of an adjoining tooth, causes the very worst form of pyorrhea. How easy it is to get a normal septal tissue if you restore contact in time, thereby preventing your pyorrhea from developing.

It is a question whether contact can be resorted and maintained in aggravated cases with amalgam, its tendency to change form being decidedly against it; in my opinion, the gold inlay is to be preferred.

Extensive cases of crown and bridge work are to be deplored. Crowns and bridges are an abomination when it comes to treating a case of pyorrhea; they give me the horrors, especially when the mouth has suffered from faulty use of the brush or no brush at all.

It is a very easy matter to educate your patients when you once get them in the office; all you have to do is to show them the condition of the mouth, giving the facts with regard to the influence on the system at large.

When you give facts stating that the medical man will corroborate your statements, they sit up and take notice; then you get their attention, if you are thoroughly alive to the issue and have faith in your proposition, for prophylaxis without faith is vain, but a great deal worse is faith without work, for it requires work on the part of the dentist and patient alike; if the patient will not do his part in helping to maintain a healthy mouth you might just as well dismiss the case, as it will eventually reflect on the operator or method and possibly both will suffer.

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*Read before the West Virginia State Dental Society, 1913.

There is such a broad field in which to instruct your patients. In teaching them how to help maintain a healthy mouth, cite to them the fact that the surgeon will not tolerate pus in any part of the system over which he has keeping, and for the very best of reasons; and why should we dentists tolerate it in the mouth? for that is a part of the human system and a very important part. Dr. Evans, of Chicago, states that 90 per cent. of the disease that enters the system gets in through the mouth. It is thought that many a case of appendicitis could be traced to a neglected mouth, and there is no question as to certain types of rheumatism being caused by infection, attributed to the tonsil gland, but where does it take on the infection?—through the mouth, most assuredly. Just for a moment consider the trouble caused by an impacted third molar; even cases of insanity have been attributed to this cause alone.

Getting right down to practical every-day operations in root canal filling and treatment, think how important it is to take time and cleanse, as thoroughly as it is possible, the root canal with sulphuric acid before attempting to fill, and it is astonishing how efficient this method is in preparing roots for filling; and then don't fill with cotton.

How important it is to be able to detect a case of adenoids and advise their early removal. You have no idea how parents appreciate this. Only within the last year I called the attention of the father of a bright lad of eight summers to this condition, when he told me that he had consulted two physicians in regard to this and they said the boy was free from anything of the kind. I told him I would risk my reputation that he had adenoid vegetation, and advised him to consult a specialist. A few days later he called me by 'phone and stated that my diagnosis was correct, it having been confirmed by the rhinologist; later he had the adenoids removed to the delight of parents and boy.

Educate them from the standpoint of the physician, getting away from the tooth, Why, some people would be better without any teeth at all, not barring artificial, for then the mouth would be washed and cleansed by the natural fluids.

Do you realize that eye specialists are coming to regard the condition of the teeth, more especially the roots, when looking for obscure causes of the disease of the eye?

Before you can present the benefits of prophylaxis to others, it will be necessary to be able to experience it yourself; the best temperance men the world has ever known have been those that at some time in their lives were down and out; so it is with prophylaxis; you have got to experience its benefits.

If you will look around over the country you will find that the men who have succeeded in prophylaxis are the men who are chuck-full of enthusiasm.

Very few people understand the true meaning of "enthusiasm" although they may use it quite frequently in ordinary conversation. Enthusiasm means far more than energy, activity, interest and hope; it means the expression of the "soul" in mental and physical actions. The Greeks used the word as meaning "inspiration," "moved by the gods," from which arose the later meaning of "inspired by a super-human or divine power."

A person filled with enthusiasm seems to move and act from the very center of his being. So should the dentist act who practices prophylaxis, his every move should be toward the preservation of health. There is a wonderful power in rightly-directed enthusiasm, which serves not only to arouse within one his full powers, but also tends to impress others in the direction of mental contagion. Mental states are contagious and enthusiasm is one of the most active of mental states.

We all want to be possessed of personal magnetism, and intense earnestness is magnetic. The best authorities agree that enthusiasm is the active principle of what has been called personal magnetism. You must talk *into* people, not at them; you must make them feel. Tell them if they want to live long and retain as long as possible their youth, which is passing away only too quickly in any case, they will follow your advice, when they will soon be rewarded by fresher looks and increased vital power.

You want to have your patients' co-operation and sympathy, and you can have this only by extending sympathy. The very word "enthusiasm" is inspiring; visualize it and let it incite you to its expression when you feel "dead." The very thought of it is a stimulant.

Learn to rely on what you yourself know to be right, learn to stand upon your own feet and do not lean upon others, and look patients squarely in the eye while you are talking to them; they will understand you, if you do not truckle to them.

With all your enthusiasm you will, in a few cases, meet with opposition or, in other words, you will be casting pearls before swine, but go right on playing the game as though nothing had happened.

Instruct your patients as to the method of using the tooth brush, demonstrating its use by the aid of the typodont; impress on them the good to be derived by brushing the gums, roof of the mouth, tongue and lips; insist on using right and left hand alternately in brushing, thereby reaching all the surfaces of the teeth alike. If you have never tried this method I advise you to do so, it will be a revelation to you. Finger massage of the gum tissue is of very great benefit, especially in cases of advanced pyorrhea.

Study the peculiarities of the mouth and teach the use of the brush, helping in the selection of the correct form of brush that best suits the case.

You will be surprised and astonished beyond measure how people appreciate this teaching. I have had them thank me time after time and say: "Why was I not told this by other dentists long ago? Had I been, I would be better situated so far as the health of my mouth is concerned, and my general health would be better."

Just in proportion as you have the co-operation of your people along this line will your method be a success; without this it will be an utter failure.

In my hands the "Dentinol" instruments have proved the most satisfactory, although there are others as good; the main thing is to know your instruments and how to use them. Dr. Robin Adair has made a selection of seven instruments, which he says have proved efficient for the general run of cases.

You will be surprised to learn how few mouths are free from calcific deposits: even when you do not expect to find any at all, if you take the dentinol file and pass up carefully under the free margin of the gum, you will be astonished at the roughened condition of the average tooth; very seldom that you find a mouth entirely free from deposits, even though the tissue does not indicate it; the septal space is where you will detect it almost invariably.

You will have to proceed with care in the beginning for this is a very trying operation for both patient and operator, and you may discourage the patient in the very beginning. Short sittings are to be commended, no matter how the patient feels with regard to this, not over one hour at any time; remember, I speak from experience. I have had patients tell me they had left my office, gone home and stayed in bed for two days just to recuperate their nervous system.

After using the scaler, removing all deposits, I polish with orange wood points and Carmi-lustro Cleaner. For quite a while I used flour of pumice, but I think the Cleaner does the work better and is more pleasant to the patient.

This is the part that I want to lay stress on, the polishing; using orange wood and by hand you bring out the beautiful luster of the enamel and give it life-like appearance, besides leaving the teeth in such condition that the brushing would be more efficient. Your patients will note this and tell you about it, remarking that their friends told them of it. Therefore, polish, and polish, applying force to the instrument, always remembering to educate your fingers to see and feel, relying on your sense of touch rather than sight. You can use an ordinary wood toothpick to polish the approximal space to good advantage in most cases, finishing with silk tape.

It is a very good plan to make definite arrangements with regard to fees. It will save disputes and misunderstandings about the financial side of the transaction at some future time. Just now I will say that your fee will have to be arrived at on a time basis; it is the only just way to settle the question. Usually it is safe to judge a man by the value he places on time; it is a reflection of his own real value.

We grow by putting to use today the things that we learned yesterday. By close observation and an earnest desire to get a better technic, the work will become easier; but it is no lazy man's work, as you will find after following it up for a few months, but when your patients commence singing your praises to their friends and are talking prophylaxis, you will commence to think as others of us do, that it is the greatest service the dentist can render humanity.

It is the duty of the dentist not only to use proper care and skill in the actual work done by him for the patient, but to give proper instructions to the patient as to the care of his teeth or mouth so far as such instructions are necessary to obtain the result desired from the treatment.

A failure to give any instruction, when such instruction should be given, or by the giving of erroneous instructions, will, if injury result, render the dentist liable for malpractice. Malpractice may consist in acting, or omitting to act, when there is a legal duty to act. It may consist in a failure to make a diagnosis as well as in making an erroneous diagnosis; it may consist in treating the patient ignorantly or negligently, or in treating him without the exercise of ordinary skill or ordinary attention, provided the patient suffers damage as the result of the treatment, or lack of treatment. If you are in possession of proper skill, and do not exercise it in the proper way, there will be no defense.

''Ability'' doesn't count; knowledge is useless; experience has no worth without the driving force of optimism. It's the steam that makes the wheels go around, it's the sparking plug of the motor—it starts things.

You will not receive the recognition which is your due in the beginning; you will have to learn by bitter experience how difficult it is for people to comprehend the most simple facts, and one of them is that a clean tooth will not decay; another fact is that a clean mouth has more to do with health and vitality than the most optimistic of the race can estimate.

In this paper, my plea has been for a higher appreciation of prophylactic measures in the mouth and a sense of the duty we owe the public to teach and impress this at every opportunity. We want to remember the history of medicine clearly, demonstrating that those procedures which have been at once acclaimed and enthusiastically received have been short lived, while those which have been slow of growth and recognition have been of permanent worth.

The endeavors of Oral Hygiene are rooted in a soil of altruistic sentiment, which looks beyond the mere question of self-benefit. Its aim is to make the weak, strong; the sick, well; to restore to them the joy of living and of usefulness, so they may again fulfill their mission in life. It aims at the recognition and the avoidance of those noxious influences which threaten human health and well-being at every step, and which modern cultural development has called into existence in the shape of new dangers and diseases in no wise ordained by nature.

It is only the visionary fanatics that question the good that has been achieved through oral prophylaxis.

DISCUSSION

Dr. J. A. Libbey, Pittsburg, Pa.: I believe that I am responsible for the bringing of Dr. Perry down here to read this most excellent paper. I expected to criticise him very severely. I think his paper is certainly just to the point. It seems to me, so far as the paper is concerned, there is very little to discuss.

He alludes, in the first place, to the contact point. That is without doubt the most important thing. Many years ago before any of us were practicing, Dr. Arthur had a practice of shaping the teeth, especially the bicuspids and molars, beveling toward the inside. That was misunderstood by a great many dentists and they would go right through with the file and allow the gingival borders to come together. We did not understand then, as we do now, the necessity of this point, the contact point; and when a filling is made not having contact point—well, it is hardly necessary to express that; you all understand what that means.

The next point he takes up is extensive bridge work. Last week there was a patient in my office who told me of a friend of his who had been in bad health for quite a while and had been to two of the best specialists in our city—men who stand very high, among the best; and they finally sent him to a Prophylaxis Specialist, and he removed bridge work and several crowns that were overhanging the edges. The teeth had never been prepared at all and the mouth was in a horrible condition. He cleaned up the teeth carefully. This person told me that the man was now enjoying good health. Both of those physicians diagnosed that case as being from the condition of the mouth, and proved it. Now, that is confirming what has been said in reference to extensive bridge work. Bridge work, as it is usually placed in the mouth, does more harm than any one thing that I know of.

Dr. Perry, as you see, is something of an enthusiast, and he tries to impress that fact upon us. There is no one who can succeed in anything, I do not care what it is, if he does not have enthusiasm. We have a wide field of work, and we have a good many things to study and find out—and, by the way, I spent most of the time on the train reading Dr. Talbot's new book, and I advise you all to get it and study it carefully. It is the best thing I have yet seen.

How many of us practice prophylaxis to the best of our ability? Not more than 15 per cent. Now I want to cite a case that I have been treating for twenty years. A man of quite extensive business in Pittsburg came to me twenty years ago (he was then, I suppose, twenty-five years of age), with pus flowing from the gums; the superior molar was the worst. I have been fighting that case for twenty years. I have succeeded in keeping all his teeth, with the exception of the four molars, which I have since extracted. When I did so he kept running back and forth from my office to his, in the same building, to stop the flow of blood, up until six o'clock, when I succeeded in stopping it. He lived on the North Side and I lived on the West Side. About ten o'clock in the evening he called me and said it had started to bleed again. I told him to call a man near, whom I knew well, and about five or six in the morning they succeeded in stopping the hemorrhage. He told me that when he had a cut on his face from shaving, or if he cut his finger, he bled very freely. I told him if he ever had to undergo an operation to inform the physician of this fact. Later he was operated upon for appendicitis. I saw him once this spring and gave him a thorough treatment. I did not see him again until about six weeks ago, and I had to go over the teeth a little again, but the gums were in better condition than I had seen them for some time. I told him to come in once a month to see me, and he admitted that he would have been a great deal better if he had seen me more frequently. When going out I gave him something to use himself. I handed him a bottle of vernas and told him to wash his mouth twice a day, brushing the teeth first and then using some of this mouth wash. I told him I wanted to see him in a week or two again. About six weeks ago I met him on the elevator and he said: "I have something I want to show you." He showed me his mouth—nice and clean and as healthy as could be. This mouth wash I gave him was just as good a treatment as I had given him. Was it the treatment that had done the work, or was it the case of appendicitis? I say that it was the case of appendicitis that cleared his system. It was a case that was beyond me, but if it had not been for the treatment he would have lost his teeth long ago.

Now, I have another case along this line that I want to speak of. Some years ago (about fifteen or twenty) my brother, who practices in Washington, Pa., was treating a case for an attorney for the upper first bicuspid. He treated and treated it for some time and it kept getting worse all the time and was finally extracted. A few months after that he came back with the bicuspid on the opposite side. He gave him treatment and asked him to come back in a week or two as he wanted to watch it very carefully and see if he could save the tooth. One day, about six months later, he came in and said: "Doctor, I want you to look at it." He examined it and it was as healthy as any tooth in his mouth. He carried a mild remedy and took it until the tooth got well. There is another evidence similar to the first case I have spoken of, and I believe if we could get people to take good care of what they eat, and not over-eat, take good care of the alimentary canal, keep the bowels in good condition, and keep the system in good condition, there will be a great deal less pyorrhea to work with.

Dr. Perry spoke with reference to the tooth brush. I put the brush in on one side then rotate it down for the upper and up for the under. I try to instruct my patients to use the brush and impress upon them that it is nine-tenths their part, if they are willing to help their case. But if you cannot educate your patients to take care of their case, you will never cure pyorrhea.

Dr. Homer Mannon, Huntington, W. Va.: It would be well if we would follow out Dr. Perry's ideals along this line. The majority of dentists go straggling along through life filling teeth and making plates and bridges without ever thinking that by practicing oral prophylaxis and educating their patients to it, they would not only benefit their patients more, but would be placing themselves on as high a plane as the medical practitioner is today.

While Dr. Perry cites to us the many causes and effects due to defective masticating apparatus, and as we know they are plain facts, it seems to me that the profession would take to the practice of oral prophylaxis in preference to the older methods of dentistry. Of course, it takes time to educate your patients as to the care of the mouth, but it is time well spent in the end.

The Huntington Dental Society has appointed a committee to meet with the Huntington Board of Education and show them what has been done in dentistry through the oral hygiene movement in public schools in other cities, what we can do in our own city, and also ask permission to do the same in the Huntington public schools. Dr. L. T. Vinson, Medical Inspector of Public Schools, is heartily in favor of same and will lend all assistance possible in getting it in the Huntington public schools.

In Dr. Vinson's letter he says: "A practitioner of medicine, I have been brought face to face with grave conditions that had their beginning in bad and defective teeth. I believe it is up to the dental profession in this country to agitate this question and to forcibly remind parents of the necessity of caring for the little ones' teeth, as every doctor knows the complications that arise from an ill-kept mouth. Some of the conditions that I have seen are, to say the least, horrible. For instance, in one of our schools wherein the children that attended were from the best families, I looked into a hundred mouths and found evidence of dentistry in but two.

"Doctors are all very familiar with the complications that arise from bad teeth and they should earnestly solicit the dentist's aid in telling the parents the great necessity of early and continuous attention to the teeth of the children."

If we allow these conditions to continue, knowing what we do as to oral prophylaxis, I can see nothing but malpractice suits staring us in the face, so let us all join hands and start this work moving.

Dr. Perry (closing): Dr. Libbey refers to Dr. Talbot's new book. 'All you have got to do is to read Dr. Talbot's new book and you will find that he bears me out in my statements. He also speaks of brushing the teeth. I have suffered from pyorrhea and am like the fellow down and out—when you get back on your feet you know what a clean mouth is. I masticated food on three or four teeth. I have better health than I have had in three or four years. I often think to myself that I attribute it entirely to the tooth brush.

Dr. Mannon refers to malpractice. When patients come into your office and you do not tell them what should be done, I think that is a good case of malpractice. I hope you will think of this carefully. Instruct your patients how to use the tooth brush, and keep the mouth clean. The dental profession does not realize half of what can be accomplished along that line.

RETENTION OF UPPER DENTURES

BY LOOMIS P. HASKELL, CHICAGO, ILL.

The theory of the retention of upper dentures without air chambers is simple.

All dentists know that the palatal bone is hard, that is in 97 per cent. of cases; but they do not seem to realize that it is the only portion of the upper jaw that does not change, while the ridge changes extensively, especially under vulcanite, on account of the retention of heat, and under metal also to some extent.

Unless provision is made for this change it is only a question of time when the plate is no longer resting on the ridge, but on the palate, and rocking. If there is an air chamber it is rocking also.

The remedy is the placing of a "relief" over the palatal bone, using the base plate wax, extending from near top of ridge to the posterior margin, narrow at the front, averaging one-half inch at the middle and sides, chamfered off flush with the model.

Of course the plate must extend far enough beyond the center to exclude the air. Plates can be worn farther back than usually made, often on a line even with the base of the tuberosities.

In about three per cent. of mouths the palate is soft, with usually a crevice in the center. In these cases the plate is fitted snugly to the palate. No relief or air chamber is needed.

Always wet the plate before placing in the mouth. Of course, in the vulcanite plate the relief is procured by scraping the impression or the plate when finished.

In flat jaws I have better success with the metal plate than with rubber. In fact, these flat cases give me no trouble whatever.

PRESIDENT'S ADDRESS*

BY L. G. BEERBOWER, TERRA ALTA, W. VA.

PRECEDENT MAKES IT NECESSARY for the presiding officer to afflict the members of this society with an address. You can congratulate yourselves, however, upon the fact that you will not be compelled, on this occasion, to listen to a long discourse. The reason for this is two-fold: *First,* the writer is not in sympathy with long-drawn-out speech making; and *second,* he could not write a lenghty discourse if he were to try.

Permit me first of all to thank the members of this society for the honor they have bestowed upon me in selecting me as their president, and although I feel my inability to fill this responsible position, yet I assure you that I have done my best.

As your presiding officer, I want to extend to all a most hearty welcome, and especially do I want to make this welcome strong to those who have not met with us before. We hope that you will not hesitate to take part in the discussions and the business of this meeting for in no other way will you make this meeting worth while to yourselves. I am confident that every one here will be amply repaid for all sacrifices made by you in order to be present. The committees have been untiring in arranging the program for this meeting and present some of the best talent within our reach. To those interested in the profession there will be many practical suggestions and food for thought for the coming year. The society is to be congratulated in having such enthusiastic and energetic committees and personally I want to thank all for their hearty cooperation, for it is to them that the success of this meeting is largely due.

It is not my purpose on this occasion to bring to you in this address any weighty and learned arguments but rather to bring before us for our consideration some of the more practical phases of the work of our organization. The fact that we have such a flourishing society in West Virginia should be very gratifying to all the members of the organization. Our present high standing and our achievements thus far should be incentives to all of us to be more loyal and to work more zealously for the good of our common cause. We have but made a fair beginning. The possibilities of our society are unlimited. I am reminded of the story told concerning a certain wealthy and retired Irish contractor. He was at Atlantic City. His friends came upon him one day pushing a two-dollar bill through a crack in the board walk. They inquired in great astonishment as to what he was doing. He replied: ''You see, it's loike this; I lost a quarter down that crack and Oi am pushing this two-dollar bill down there to make it worth me whoile to tear up the walk.'' We have each put something into this organization but it is a case of putting more into it to make it worth our while. There is much for the West Virginia Dental Society to accomplish. New laws are needed. The public need to be educated to the proper conception of our profession. There is need of a closer bond of union among ourselves. These and much more may be accomplished if we but band ourselves more closely together and work for our common good.

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*Address to West Virginia State Dental Society, 1913.

Industrially our fair state is forging to the front in a way that is making the folk in other states sit up and take notice. Our commercial, educational and professional organizations and activities in the state have assumed such proportions that we consider these achievements with pride. Are we, in the midst of these signs of progress, when all other professions are being efficiently organized, going to sit idly by and see our profession outstripped in organization and efficiency? Our society need stand second to none as a strong and influential body. And I mistake the quality of the members of our profession here assembled if it is not the deep purpose of each of us to perfect our organization and make it effective in the securing of better laws and the advancement of our profession along all lines.

The society stands for all that is best in the profession. Its purpose is to bring us together in these meetings where we may discuss our problems; bring out individual ideas and practices which may be of benefit to all of us. This exchange of method makes us all more efficient and enables us to do more and better work, besides it develops a social and fraternal spirit that tends to bind us together into a closer union. It is to be regretted that so many men of ability, who could be of such benefit to the society, do not see the necessity of an organization of this kind. Some of them have little pet ideas of their own that they are afraid some one else will copy if they associate with the brethren of the profession, while others are unwilling to make the expenditure of time and money that would be necessary to attend a meeting of this kind. Thus they become professional parasites, benefiting by the work of others yet never contributing anything themselves. Right here is a good field for active missionary work. Many of these brethren could be induced to come into the society if proper methods were used to reach them. There should be a warm feeling in the heart of every dentist in West Virginia toward the Dental Society whether he be a member or not, for it is through this medium that the professional standard of the state is to be raised and our ability to render aid to the public to be recognized.

It is unnecessary to go back to the dark ages of dentistry when the blacksmith and the barber vied with each other to see how many teeth they could "pull" in a year, or rather to see how much pain they could inflict. Neither will we take the time to discuss the profession when a few individuals began to fill the most simple cavities, to carve artificial dentures from ivory, or even to insert crowns on hickory posts. These were the times when each man worked out his own ideas and used his individual methods. The day of the Dental Society then dawned, and the Dental Magazine began its work of bearing tidings to those who could not or would not affiliate with the society. These two factors moving hand in hand have become great powers in our profession. In this day-gone-by every member of the profession was a competitor of the fellow across the street. It was not a matter of how many new patients he could get and thus benefit society, but how many could be induced to leave the other fellow. Today conditions have changed. These men who formerly were antagonistic are now, in a very large measure, co-laborers. Some have been more successful than others, but that is as it should be, for all have not the same ability. In business and in all other walks of life some excel. The same is true in our own profession. Just along this line the following from THE DENTAL SUMMARY is to the point:

"Life is short and time is fleeting—
Don't knock.
Hence I say and keep repeating,
Don't knock.
It's a habit blamed disgusting;
Better far be up and dusting—
Don't knock.
Who are you? And what's your pleasure?
Don't knock.
Stand up while we take your measure,
Don't knock.
Slandering the other fellow
Always shows a streak of yellow,
Those who reach an old age mellow
Don't knock.
Have you valued goods to barter?
Don't knock.
Tell about them for a starter—
Don't knock.
There are persons I could mention,
Who are devils at invention,
Lying to divert attention—
Don't knock."

Dr. A. O. Ross,
807 N. High St.,
Columbus, Ohio.

The time has come when reference to a professional man or to a profession means more than it did a few years since. If our profession does not measure up to the standard it is our own fault and ours only, for the public at large accords us the recognition we demand of them and no more. This is a day of sanitation and prophylaxis, a day when the professional man is expected to prevent disease rather than effect a cure after the system is exhausted by its effort to eliminate the poisons and the body is racked with pain. One of our great aims in life should be to teach, and in proportion as we are able to do this will our profession receive the recognition which is its due.

This is the time when we, as a profession, should assert ourselves and say to the public that a very great part of the suffering due to neglect or to faulty service is unnecessary and could be avoided by early attention and the elimination of the idea of getting the cheapest service possible—or in other words, getting the largest filling for the smallest piece of money.

This condition of affairs cannot be brought about by a few men in each section of the country but by a united effort on the part of all, or at least, of a very large majority of the profession. Washington did not win the battle of Independence alone, but it was won by the loyalty of the starving, poorly-clad men who stood so nobly by him at Valley Forge. The Union was not preserved by Lincoln alone through his witticisms or his proverbial sayings, neither entirely by his executive ability, but through the patriotism and loyalty of the men who wore the blue and dared face the cannon's mouth for the cause they loved. So it has been in the past, and the present holds no new method. Before any great achievement is possible it is necessary for the rank and file to get vitally interested.

Unfortunately, our state societies are made up of a minority instead of a majority. This is why we fail to influence legislation. When we ask for laws governing the practice of dentistry the legislators invariably ask who is interested in these proposed laws, and when they are told "the State Society," they immediately inquire as to the numerical strength of the society, and, unfortunately, they do not appreciate quality to the exclusion of quantity. We need a united front. When we speak, we need to speak as one man. This is especially true of our own state. What we need more than anything else is proper legislation. In order to get this we must have a stronger society. We must have a closer bond among ourselves. When a bill is drafted by the society and endorsed by it as a whole, it is the duty of every member to stand by the measure and assist in its passage. There will be matters of minor importance upon which we cannot agree, but, as a whole, any measure endorsed by a majority vote of the society will be of benefit to the profession at large. Unfortunately, this has not been true in the past and some of our members have gone so far as to oppose measures that were endorsed by the society, by writing legislators from their districts and urging them to vote against the measure. I trust that we can come to a more definite understanding regarding this matter, for we need not only numerical strength, but fraternal strength as well.

Now, in conclusion, in order to make our dental society work more effective, I would suggest that local societies be formed all over our state to meet at intervals, to discuss such matters as might come up, and, if for no other reason, to get better acquainted and to form a closer friendship among ourselves. There are at present some eight or ten societies of this character in the state doing splendid work. There should be ten more such societies organized. Then we have the Southwest Virginia Society of which I know but little, it having but recently organized, but I bespeak for it your most hearty support. Last, but not least, we should, if it is at all possible, affiliate with the National Dental Society, thus lending our strength to them and at the same time benefiting ourselves.

HANDLING OF CASES OF FRACTURE OF THE JAW

BY DR. J. W. DANIELS, SHIRLEY, INDIANA

The Indianapolis News of a few weeks ago speaks of the extraction of a tooth for a patient who was suffering with a broken jaw, "to allow liquid nourishment to be given through a rubber tube."

It would appear on the face that this operation was performed by an operator who had not realized the real importance of saving teeth, for it does seem that a man of dental training would do some thinking at such a time and conceive some way of administering food without the loss of a dental organ.

In a few cases of this kind that I have been called upon to treat, I have obtained very gratifying results by the use of modeling compound in the following manner:

"The broken parts being placed in proper position and securely wired, a small quantity of modeling compound is softened and placed between the back teeth, on either side, and while the compound is soft, allowing the operator's hand to close the lower jaw until the space between the teeth is just wide enough to allow a rubber tube or a straw to pass between the teeth. Then hold the lower jaw in this position until the compound has hardened, not allowing the teeth to come entirely together after the compound has been placed in position. The hardened compound has proven to be of sufficiently stiff consistency to hold the lower jaw very securely until the fracture has healed, and is almost sufficiently impervious to make it quite sanitary.

MECHANICAL METHOD OF MIXING ALLOY*

BY DR. SOL S. LINK, PHILADELPHIA, PA.

Always bear in mind that every alloy should be mixed with enough mercury to allow but a small quantity to be squeezed out when the mixing is completed.

Place the measuring slab on top of the body of the mixer, allowing the flat surface of same to form at bottom of the hole selected to govern the size of the mix. Select a hole (in the row of large holes) two sizes larger than the prepared cavity, fill it with filings (if shavings are used fill the large hole twice), fill the opposite small hole with mercury, slide the slab along to allow alloy and mercury to drop into the hole where the mixing is to be accomplished.

Now attach the spindle to the dental engine handpiece, very securely, place the compression plunger in place, start engine and allow cylinder to settle down of its own accord, gradually.

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*Clinic at West Virginia State Dental Society, 1913.

If the compression cylinder goes down too fast, before the amalgamation is started, small globules of mercury may be forced out around the edges. Run the engine at a high rate of speed for 20 to 30 seconds (this time will vary, according to whether the particular alloy is difficult or easy to amalgamate), remove the plunger, drop in four or five drops of alcohol (a sprinkler-top bottle, such as toilet waters usually come in, will be the most convenient means of handling the alcohol), replace the plunger and allow the engine to run for five seconds longer. Just before stopping the engine, raise the plunger a quarter of an inch. This will cause the mix to form in a mass which can be easily removed with pliers, or emptied out. Place the mass in the palm of the hand and further wash with a little alcohol, and squeeze out the excess mercury.

If your alloy does not mix readily a little pressure on the plunger, while the spindle is revolving, will hasten the amalgamation.

The best alloys are usually the hardest to mix.

NITROUS OXID AND OXYGEN ANALGESIA*

BY DR. GEO. N. WASSER, D.D.S., CLEVELAND, OHIO

DR. WILLIAM H. DEFORD in his late book. "General Anesthetics in Dentistry," says, "Bold in other directions, commendably progressive in all that relates to manipulative ability and artistic development, the dental surgeon shrinks from anesthetics. He cuts living tissue. lacerating the nerves themselves, 'performing laparotomies upon the teeth.' so to speak and the anesthetic usually employed is that of a witty speech or an amusing story while the patient suffers, cringes, agonizes almost to the state of collapse. In this enlightened age no surgeon, except a dental surgeon, permits a patient to undergo, without an anesthetic. tortures equal in severity and duration to those to which one submits during the average dental operation."

Dr. Rhein recently reminded us that we as a profession occupy a unique position, inasmuch as we claim to have first introduced the benefits of general anesthesia by means of nitrous oxid and yet today we find ourselves in the lamentable position of being subject to the criticism of the medical world because our work is so much dreaded and feared by patients.

It is a mystery to me why a profession so progressive in every other way is so slow to take advantage of such a beneficent and efficient agent for the relief of pain (the great bug-bear of dentistry) as nitrous oxid and oxygen. It is safe, positive, quick to act and altogether a joy to any dentist who learns to use it.

Dentistry, at the best, is an exacting. nerve-racking profession. Every man who inflicts pain undergoes severe strain and if persisted in year after year that nervous strain will break down any man no matter how strong.

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*Read before the Cleveland Dental Society, 1913.

Now, nitrous oxid and oxygen will not eliminate all the nervous strain of a busy practice, for we will still have to listen politely and affably to the troubles of our patients, to say nothing of many other annoyances with which you are all familiar and that can not be anesthetized.

The writer has used nitrous oxid and oxygen for four years and a half, employing it practically every day, principally for the excavation of sensitive cavities. In all these administrations not once have any alarming symptoms arisen. I can recall but three cases of nausea which were of slight duration and brought on by administering too soon after meals.

Nitrous oxid and oxygen has given me more satisfaction, afforded me more gratitude from my patients and increased my practice to a greater extent than anything else during my eighteen years' experience in dentistry. It will do just the same for you, if you take the time to learn the simple technic of using it.

It is not my intention in this short paper to go into the detail of how to use it. To those who are interested in this great boon, to patients and dentists alike, and want to avail themselves of its beneficent results I would advise as a first step the reading of Dr. Wm. H. DeFord's book, published in 1908, "General Anesthetics in Dentistry." It is in the form of lectures and I believe the best thing that has been written for our special needs. If, after reading Dr. DeFord's book, you desire more information as to apparatus and technic of using nitrous oxid and oxygen, write to the Teter Manufacturing Company, Lennox Chemical Company, Ohio Chemical Company, all of Cleveland, or A. C. Clark Company, Chicago, or Dr. E. I. McKesson, Toledo, asking them to send you literature on the subject. They will gladly send you reprints of papers by the leading users throughout the country.

The principal thing to contend with at the beginning is the operator's own fear and nervousness. I presume there is no way to so effectively acquire that ease and matter-of-fact air that is so essential in order to allay the apprehension and nervousness of the patient as a thorough knowledge of the anesthetic and apparatus employed. The writer had some difficulty in making a start in the use of a general anesthetic. The apparatus loaded with four formidable-looking cylinders stood in my office some weeks before I could muster up the courage to try it on a patient. I had administered it to myself a number of times and liked the effect. Analgesia is a mild, pleasant form of intoxication—not unlike a "jag" I have been told. The first patient I selected was a young man of about twenty years, of unusual intelligence and in excellent health. His teeth were highly sensitive but he had good control of himself and made me no trouble. But as it has been my practice from the beginning to inflict as little pain as possible I had been struggling along with high-pressure anesthesia and getting good results in some cases. In the case of this young man I found a cavity where I couldn't get results. I told him about nitrous oxid and oxygen. He had no fear whatever and the results we got were very pleasing to the patient and most gratifying to me.

My principal difficulty at first was in letting the patient have too much of the anesthetic. Not that it did any harm other than the patient would close his teeth, in consequence of which work would have to be suspended until he recovered sufficiently to be amenable to the operator's suggestions.

On giving nitrous oxid and oxygen to a patient the first time, take sufficient time to explain how he may expect to feel. Make it clear that the thing is under his own control, inasmuch as you only cover his nose, enabling him when not feeling any pain to breathe through the mouth. Instruct him that on the slightest twinge of pain he can take two or three inhalations through the nose and get immediate relief.

The two extremes in analgesia are hilarity on the one hand, meaning too much oxygen, and unconsciousness on the other hand, which, if carried too far, will result in cyanosis caused by too much nitrous oxid. Patients vary as to susceptibility as they do in other drugs. Some require but a few inhalations when they get a characteristic tingling in the hands and feet, while others require quite a quantity before getting any effect. These peculiarities have to be learned and taken into account.

With the apparatus now to be had it is possible for the operator to also administer the anesthetic. But it is not advisable, as the operator's undivided attention should be given to the patient and the work in hand. Everything in the operating room should be as quiet as possible. Other than the suggestions and instructions from the operator to the patient there should be no conversation in the room. The operator having adjusted the inhaler, (I use the Gregg inhaler and will pass it around the room for your inspection—it is most satisfactory), and, being ready for the nitrous oxid and oxygen, signals instead of words should be used to instruct his assistant what he wants done—as by way of example—a movement of the thumb should always mean more oxygen and of the forefinger nitrous oxid. By carefully watching and keeping the lips a normal color you need have no fear of too much nitrous oxid. Upon noticing indications of sleep I tell the patient to breathe through the mouth. This is a signal for the assistant to turn off the anesthetic; on the other hand if the patient begins to wince I tell him to breathe deeply through the nose a couple of times and the sensation will disappear. This is a signal for the assistant to turn on more anesthetic. For this system of signals I am indebted to Dr. E. S. Barber, of Chicago.

I said in the beginning of this paper that I have had no alarming experiences with nitrous oxid and oxygen. I expect never to have. But it is well to be prepared for any emergency. So I would advise anyone using this agent to familiarize himself with the Sylvester method of artificial respiration. Have a pair of tongue forceps, mouth gag, hypodermic tablets of strychnia sulphate 1-20 grain, aromatic spirits of ammonia and brandy. Avoid mucus, blood or dust accumulating in the throat as it might cause nausea. Work with the head slightly forward and the chin dropped a little, just enough so the saliva will run forward and can be taken away with a saliva ejector which should always be metal to avoid any accident that might occur with one of glass.

It has been proved that by heating the gas you can reduce the amount required from one-third to one-half; moreover the patient takes it much more easily. The results are wonderful; the warm anesthetic does not irritate the patient's throat, he is more quiet and the mixture is more effective.

DISCUSSION.

J. P. HENAHAN: We have been particularly fortunate this evening in having presented to us papers of so much merit and withal so concise. The text of the essays bespeak the success and long experience of their producers.

Before going farther I would like to ask Dr. Wasser to radiate a little on the only point in his paper which was not entirely clear to me. In his description of the effects produced by the gas, he says, "a feeling not unlike a 'jag' I have been told is produced by the inhalation." What can he say that will be more enlightening to the poor fellow who has never experienced the exhilarating effect of a "jag"?

So many men throughout the country are now practicing cavity preparation and other dental operations painlessly through the assistance of some anesthetic or obtunding agent, and so often has the efficiency of the different methods and agents been demonstrated that it would seem as if every one of us should have more or less experience with some one of them by now.

The day of painless dentistry is here and it is not longer a matter of choice with us whether or not we practice it, it is a matter of necessity for our own individual preservation.

Now, however, is the time for the progressive and wide-awake man to get on the band wagon, for not all the reward of his labors will revert to the patient, who has no doubt so much to be thankful for.

The successful employment of either of the methods, the use of which was explained this evening, will not only result in saving pain and shock to the patient but will result in a manifold reward to the dentist. It will increase his earning capacity by making it possible for him to accomplish more in a given time, and with a smaller outlay of nervous energy. The patient delighted with having escaped much or all of the expected pain goes forth to sound his praises and the avenue for increasing fees and practice is widened.

Regarding high pressure, I cannot say much. I have not had much experience in its use. During the last five years in which I was engaged in general practice I always had a high-pressure syringe at my command, but while I followed as nearly as possible what instructions I received, still I enjoyed only indifferent success. However, I do not blame the method, I know that the fault lay with the operator, for I realize that what one man can successfully do another man should be able to learn. However, I believe that up to date there is something to be reckoned with, for just like myself a great many men enjoy only partial success from the use of this method, due, I presume, to a lack of fineness of technic. The fact that so much effort is necessary added to an unswervable adherence to technic will, I believe, always be a hindrance to its universal use, especially among dentists of average ability.

Regarding nitrous oxid and oxygen analgesia I believe that the greatest obstacle to be overcome is the natural and inborn fear which many men have of anesthetics.

Terrible possibilities arise and parade phantomlike before their inexperienced minds. As a matter of fact, while there is always an element of danger present during complete surgical anesthesia, there have been no reports of any serious accidents resulting from the use of the agents in the analgesic stage.

The chief danger from anesthetics, especially chloroform and ether, is met with in the second or exciting stage, when through sudden and very deep inhalation so much of the anesthetic vapor is carried down to the lung spaces in concentrated form that paralysis of the cardiac and respiratory centers results.

Therefore we may see that especially with nitrous oxid and oxygen as it is employed for analgesia, no danger can result, for it is so diluted before entering the air passages that it is impossible for dangerous conditions to arise. To those within hearing who contemplate taking up this work of analgesia let me say by way of encouragement that while there will be some little difficulty to overcome at first and more or less experimenting will have to be done to lead to its successful use, still in this respect the trouble to be met with does not compare with that which has been overcome by these same men in perfecting some other operations which they now approach without hesitation.

Once a beginning is made persistence and perseverance are all that will be necessary to insure success. The man, who after one unsuccessful trial, shoves his machine back into the corner and acknowledges defeat is deserving of nothing better than defeat. It would seem unreasonable for any man to expect as much success to attend his first efforts as attend the efforts of a more experienced practitioner. This, I believe, would apply even more so to high pressure than to analgesia.

The use of nitrous oxid and oxygen in the analgesia stage is, as stated before, practically without danger and the troubles to be met with are in the nature of annoyances and are preventable to a degree.

When allowed too much anesthetic the patient sometimes experiences overstimulation and indulges in loud talking and singing and in this condition cannot be worked upon. Alcoholics are very likely to stir up some sort of a fuss if he finds a dentist foolish enough to bother with him.

The essayist mentions nausea; regarding this I think it wise to caution that in regard to diet that previous preparation is as necessary for analgesia as for anesthesia. Better results are obtained if the patient's stomach has not been gorged by a recent meal. At any rate the patient under these conditions is just about sure to block up your nice new fountain cuspidor.

If I am allowed I would like to mention my method of procedure in analgesia cases. First I bring to my assistance suggestion; I use definite language not long drawn out to impress the patient as much as possible with the certainty of the result. I inform him that the proceeding is one constantly resorted to and that there is nothing to prevent this case from being like all the rest if the patient assists.

Then I arrange all parts of the machine. To do this I open wide the valve between nitrous oxid bag and inhaler, then place the open palm of both hands on either side of bag and flatten it out by forcing out surplus gas, then I open wide the port holes on the side of the inhaler, the oxygen indicator I open to about ten, then I place inhaler upon nose not too tightly, and instruct patient to breath through nose. Then I allow the smallest possible amount of nitrous oxid and oxygen to leak into bag. Be in no hurry to commence, wait two to four minutes and then do not attack the tooth like heaven and earth depended upon your efforts—take it easy, take an elevator and do a little very light work. Remember you must still get the patient's confidence. Then do some actual work on a less important part of cavity and allow the effects of your analgesia to accumulate. Little by little you can do more and both the patient's and your own confidence is established. If you need a little deeper condition close the port holes on inhaler a little. This excludes a little air and vice versa.

As stated before there is practically no danger to be met with in the use of this but no harm can be done by fortifying oneself by having means of assistance at hand. The doctor mentions several which are of reputed value. The Sylvester method of artificial respiration can be slightly improved upon by using the method now in use upon subjects of electric shock.

The patient is turned upon the breast and with head in such a position as not to interfere with free ingress and egress of air or oxygen, the operator straddles back of patient and keeps his weight upon his knees. He reaches forward and grasps the arm of patient and extends them sidewise, hands about two or three inches from floor, and simply extends them above head until the thumbs meet, and repeat; to test its efficiency try it upon yourself.

I would by all means advise the presence of an assistant. While that is not wholly necessary to the successful use of analgesia it is a help and then it is a protection to yourself. The law requires the presence of a third party capable of being a witness. It is a wise law founded upon many lawsuits, years ago, which wrecked the character and practice of sometimes innocent men.

DR. GEO. H. CAMP: I wish to congratulate the essayists and also the program committee, for bringing to our attention a subject of such great importance to us as a profession.

There is nothing to my knowledge that is a greater practice builder than to prepare and fill teeth painlessly.

It is the fear of pain that keeps many people from us until an aching molar or an abscessed tooth drives them to what they deem the chamber of torture. It is then our painless methods are most needed, as the initial visit of the patient will undoubtedly be repeated, providing the operation be rendered painless.

It is, therefore, not the method employed, be it H-P A or N_2 O O A that is of importance. It is the result obtained thereby. After several years' experience in the use of H-P A, I find the pressure seems ineffective, with the exception, however, in cases of normal pulps.

Dr. Smith in his paper on analgesia says, "The greatest opportunity that has ever been presented to the dental profession for eliminating pain, produced by dental operations, is now offered us in being permitted to do operative work upon our patients while they are in the stage of analgesia, which, as you all know, is produced through the agency of N_2O and O gases."

For preparing deep cervical cavities, in preparing and shaping teeth for crowns, in adjusting cervical clamps, in gaining access to deep-seated pus pockets, rapid wedging of teeth to gain space for cavity preparation and filling and finally in working on those extremely nervous patients, who are scared half out of their senses before you begin operation, I find N_2O and O is unsurpassed. Confidence, however, in your own ability to administer the gas properly is absolutely essential to success.

In my experience the following rules have applied in most cases: By using the large cylinders, a definite mixture—N_2O, 15 per cent.; O, 5 per cent.; air 80 per cent.—and an even pressure is obtained at all times, no adjustment being necessary, except an air valve on the nasal inhaler.

Warm gases are by far superior as they expand one-third to about one-half more than when given at the ordinary temperature, and are not irritating to the delicate mucous membrane.

The same light touch, as used in the absence of gas, should be employed by the operator, engine running at medium speed, care being taken not to overheat or the patient will wince, unless in the deep stage of analgesia.

So many say too many pulps are exposed by this method. That is absolutely impossible if you use proper precaution and do not hurry. One-half hour is the longest period of time to keep a patient in this condition and not more than once a week to the same patient.

The cost of producing and maintaining prolonged analgesia depends on the methods employed and the quantity of gases purchased.

Just a word in regard to the effect of analgesia upon the system. It has the power to numb the sensory nerve centers in the brain. These nerve centers govern the sense of pain. They are rendered insensible to pain through the N_2O being taken up by the blood causing irritation at the peripheral nerve endings; therefore, the patient receives no shock, not only in the individual tooth, but the whole nervous system as well. In conclusion I would suggest that no operating room is complete without N_2O and O, and a fair trial of the same will bring surprisingly favorable results.

Dr. Milton D. Neff: Very much like other kinds of work, it is often true in the use of H-P A, "that the longest way around is the shortest way home." How many times have you failed when you tried to utilize a carious cavity within which to place the pit for the syringe point? Perhaps you wanted to save the drilling of another hole, which you might otherwise have placed at a more advantageous location on the surface of the tooth. Probably that meant you had to strain conditions in your attempt to get proper contact, supposing it were a distal cavity in bicuspid or molar. Curved points are furnished with some instruments, but I have seldom found the curved point of any value even for that technic.

Direct straight contact sounds the keynote of success for H-P A. The *point* of contact between operator and patient surely is a very important point. If the work is being done on a lower tooth have the patient close the teeth tightly to obviate any moving of the mandible. Where the pit has been drilled in a position making this impossible, or where other apparatus precludes it, I place a mouth prop, sometimes just a cork between the teeth, biting upon which will steady the mandible. I can not emphasize too strongly the important points the essayist makes concerning the forcing of a cocain solution through healthy dentinal tubuli of a freshly-made cavity instead of through tubuli leading from an existing cavity, presumably.

Right here I must digress for a moment to express my appreciation of the essayist's insight which makes plain to us the folly of trying to utilize the existing cavity where we would force ptomaines through the diseased tubuli and later have to make an accounting for the soreness and perhaps ultimate death of the pulp. I can not too heartily commend the doctor upon his wisdom in urging the necessity of working through healthy structure. It may not have appealed to all of you as such an important point, but regarded scientifically instead of mechanically it looms up as a shadow of portending evil when we realize the probability of causing one trouble in a misdirected effort to eliminate another. If my humble discussion accomplishes no more than to emphasize the respect due this one point I shall feel more than satisfied.

I will confess that I used to think it the most practical procedure to utilize the existing cavity but some experience and a little reasoning has since changed my opinion. However, to those who are not ready to abide by the simple yet scientific reasoning offered by the essayist on the argument of forcing septic matter into the pulp, my other answer to any such would be that if you anesthetize through a new cavity you can repeatedly test the sensitiveness of the place to be filled and stop pressure just as soon as sensitiveness is gone in that place. It is sometimes practical to place the pit so near the cavity that it may finally be included in the filling. Now then, an instrument of such constructure which does not admit of the possibility of any more cocain solution being forced into the tooth than is necessary should give you the satisfaction which is intended. In other words, I have seen no reason for changing from use of the same style instrument I used at college which is simply a barrel with a screw-driven piston for pressure. With this mechanical force there is *no possibility* of getting too much cocain into the pulp when the operator is particular to keep testing the sensitiveness of the carious cavity, and stop pressure as soon as thus indicated. With the screw-driven force you can actually feel the resistance and note the intake. Most any one would stop the obtunding at the proper moment if he knew just when he had done enough.

So I contend that the simpler the method the more generally successful. Instead of being required to study out the peculiar construction of each tooth (and its owner) and calculate to a nicety the time required to consummate the obtunding, and even then to sometimes find it incomplete or perhaps overdone, if the operator is not yet perfectly experienced; *instead*, contrast with it the simple procedure of introducing just as much cocain solution as you find is effective, with an instrument which is always under control, whether it be screw-driven or ratchet-controlled.

My discussion is confined to the paper on H-P. Though I sometimes find good occasion for employing nitrous oxid in cavity preparation my general recourse is to H-P. I have never had any deleterious effects which could be traced to the obtunding.

My technic of tooth preparation corresponds exactly to the essayist's, which I will illustrate in contra-distinction to a method formerly given publicity the prevalence of which I believe was accountable for much failure. Sinking a No. ½ bur pit at bottom of a saucer cavity presents the small periphery of an opening into which the beveled point of the H-P needle is placed. This makes a tight fit although it is only at the mouth of the pit.

The old way was to ream the pit with the point of a flame-shaped bur which made a tapered hole into which the tapered needle was expected to fit on exactly *the same line of approach*. It is obvious that the slightest change in position would spoil the exact fit of one taper within the other, whether the patient moved or the operator, whereas the method advocated makes the beveled needle impinge within the rim of a cylindrical hole; hence a little movement makes no difference, it may ride a little in any direction without impairing the fit. I rarely find need for the rubber dam as there is little chance for cocain escaping, and with an instrument which feeds it out gradually under screw pressure with the resilient force of liquid compression as the main factor in maintaining H-P, there is seldom occasion for using anything more than cotton rolls and saliva ejector because the liquid can not come out rapidly.

SCHOOL HYGIENE*

BY J. N. HURTY, M.D., INDIANAPOLIS, IND.

"NOTHING IS SO INTERESTING as little children. Do something for little children, if you want to do some good."

I think that is a very apt quotation, and it is literally true. The wise man of Scripture also said, "Train up a child in the way it should go, and when it is old it will not depart therefrom."

But I am not here to formulate religious creeds. I begin by saying that every child has a right to be born free from taint, as well as to be brought up in the fear and admonition of the Lord. I am sure you will all agree with me that a child is entitled to the endowment of pure blood in its veins. The state of Indiana is striving earnestly to secure these rights for our children. One of the agencies through which we shall work is the public schools. So tonight we are to have a little talk on this subject.

Some one has said, "The health of the people is the first duty of the statesman." It is now believed by many physicians that tuberculosis is acquired in childhood. That is indeed almost universally admitted by the medical faculty. Let us now take a look at the tubercle bacillus. How in the world did that investigator ever run that down and find out that this little organism was a cause of disease?

Here again we have the bacillus of diphtheria. This is one of the most formidable enemies of the child we have to fight, in the schools, in all quarters, indeed. Loeffler, who discovered this germ, has given us with his discovery, an effective weapon with which to fight it. We are able fully to control and subdue it. We know, furthermore, enough about its origin, its inception and development, to prevent it altogether, provided we can have the co-operation of the people, can insure observance of sanitary precautions. At all events, we have actually the mastery of diphtheria today. We can stamp it out, even if, despite precautionary prophylactic measures, it evades us and gets a start. Anti-toxin is a sure and efficient remedy, if employed early enough.

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*A talk before the Indiana State Dental Society, 1913.

Foremost of all arising among other questions concerning the welfare of the child is that concerning environment. The common impression of the public mind is that only in the slums of our cities or in the dilapidated, densely populated districts of the same, districts abandoned and given over to the wretched poor, are found conditions favorable to disease breeding. The lack of fresh, pure air, of nourishing food, of sufficient clothing, and other kindred considerations, are popularly supposed to pretty much cover the ground pertaining to this matter of unhealthfulness among the classes not carefully nourished, hemmed about and protected, as are the offspring of the well-to-do and the wealthy.

But in order that we may be convinced that conditions most unfavorable to health, in the child, may and do exist right in the open country, I have had a number of pictures made, showing the conditions, external as well as internal, of some of our public school houses in country districts.

Here we have a picture of what is called the ''Dry Fork'' school house, in an Indiana country district. Notice the dilapidated appearance of the weather boarding, the sagging beams supporting it, and more particularly the stagnant rain-pool extending under the further end of the building. A disease-breeding agent, beyond question, that pond. Here is an inside view. Notice the plastering broken and wholly missing, the lathing being exposed in numerous places. This is one of those school houses in which the children take turns in running up to the stove, every few minutes, to get warm. The winter air has free access to all anywhere near the walls, because of the wretched condition into which the interior of the building has been allowed to fall. On little girl told me she was always freezing on one side and roasting on the other.

One end of the structure actually dips into the water of the pool, as it were sucking up moisture. This ought to be an excellent breeder of various diseases promoted by dampness. All over the state of Indiana you may find such examples of unsanitary school houses.

Here we have a picture of another school house. I submit to you the question whether it is not outrageous to send children to such a place. Yet out of the little red country school house we are told have gone many of the great men of this and recent years. We are somewhat prone to flatter ourselves over the successful products of our institutions, without regard for what might have been a larger, worthier success, if conditions had been better. The great men of the past, who have themselves eulogized the little red school house, might well have withdrawn themselves from the glamour of fond memory of a somewhat dim past, to say a word for improvement, had they been so inclined.

Here is another view of a country school house, with plastering fallen away from the inner walls, so that in winter, as we here see depicted, the great stove in the middle of the room being red-hot, children near it must hold up their atlases to keep off the heat, while others only a few feet away, nearer the walls, are freezing. How can children be expected to study and learn under such conditions?

This condition of things in our country school is as much out of date as an old-fashioned stage-coach on one of our roads would be today. Yet if we go among those people and insist on a change, we are called cranks.

Here is a picture of a school child showing adenoids. Notice the always open mouth, the somewhat dull expression. This boy is naturally bright, yet he always appeared at a disadvantage, being deemed dull by his associates and his teachers, until after he was operated on, and the adenoids removed. Notice in this second picture, taken since the operation, how much brighter he appears. This is usually the case with children suffering from adenoids. Many an apparently dull child has come out in true colors, after this common drawback to progress in study has been removed. This boy now has a "chance for his white alley."

Here is a little Indianapolis boy, about nine years old. Had always been ailing. Doctor after doctor had prescribed for him, none seeming to diagnose his case properly. The family physician said of him, learning that he was backward in school, "He is bright; I insist he is a bright boy, notwithstanding appearances are against him."

This boy was operated on for adenoids, and today is a fine student, justifying the opinion of the family doctor.

Here we have a view entitled, "Wanted, a play-ground." Notice the small boy wandering listlessly among garbage cans and accumulated rubbish, in this city alley. The child is ragged, dirty, neglected. He is to all appearances a bright child, of good heredity, but his environments are most unfavorable, such environments as discourage ambition and encourage a career of crime. How can you expect to have good citizens under such adverse conditions?

Before long we are to have the operation of what is called the "Housing Law," providing that landlords shall be compelled to render houses and premises they offer for rent at least sanitary.

Here we have an inside view showing old benches and desks of one invariable height for pupils of all sizes. Here we see a boy bending over a writing desk much too low for him. Curvature of the spine results from inattention to just such abuses as this. Here again is another pupil, too small for the desk. Has to reach up distressingly to see the paper on which she is writing. Eye trouble, eye-strain, may be a sequel to that. These desks are probably a lot made by the carpenter nearest at hand.

Here is a child seated at a modern style of desk. But you notice she seems pretty large for it. Her right shoulder is higher than her left. She is one of the kind who dream and cry out in their sleep, and the members of her family no doubt boast with pride how smart she is in school, only they notice casually, that she sleeps fitfully, although the fact gives them only passing concern, if any.

Here is a picture showing curvature of the spine—Pott's disease—a very well defined case. This is what desks failing in adaptation to the pupil's size bring about.

Here we have a kindergarten scene. Well lighted from above and on all sides. No possibility of eye-strain here.

In one of the country schools cultures were made from a bucket left standing with an inch of water in it. They showed swarming millions of bacteria. Yet beyond doubt, when next that bucket was needed, it would probably have been emptied, without even a rinsing, filed and drunk from by the children.

Here we have an out-of-door school scene. You see this row of children asleep on the roof of a Chicago building, each lying, heavily wrapped, on a cot. It is part of the school system that each and every child shall sleep an hour, at noon. They are also well fed. These children are steadily improving in health, many having become robust, who were a short time since spindling, feeble, fair marks for disease, especially tuberculosis. They are so interested in their school that recently the boys declared against a vacation, preferring to remain in school right along.

Here are the children gathered for medical inspection. Notice the pathetic appeal in the eyes of some of them. "What must we do to be saved?" might suitably be inscribed on their foreheads.

This work among poor, neglected children is becoming of national significance, of world-wide dimensions. Indeed, we are now only at the beginning of organized effort. The appalling fact that we lose every year one-half of all infants born, by cholera infantum, and that through the ravages of other combined diseases, one-fourth of all children must die, is not that a sufficient plea for the continuance and the enlargement of the scope of this most noble work?

DISCUSSION

Severance Burrage, Indianapolis, Ind.: There are many varieties of culture germs, many of them disease germs, extremely virulent, others not so, but harmless, or comparatively so. We must have these various cultures made under the most favorable conditions, as regards heat, darkness, and other specifications I might make; such conditions, we must remember, as are not always to be found in nature's laboratory. The human mouth seems to be a sort of incubator of germs. We have in the mouth conditions of temperature, moisture, and so on, favorable to the development of certain germs.

Now, under favorable conditions, as shown in this series of pictures, one of two things will come to pass: germs will multiply indefinitely in the mouths of some or many of those children, conditions favoring, or if they do not multiply, will at all events persist for a longer or shorter time. For the most part the mouth is the breeding place and the storage place for bacteria. It is not necessary that I should go into detail to account for the presence of bacteria in the mouth; that would take too much time, and is, besides, off the subject. From babyhood until we fall into our graves, we are constantly being exposed to the influx of these germs. The child who sticks a dirty pencil into its mouth is inoculating itself with germs. These remain and multiply, and if they happen to be of a specific nature, it becomes diseased.

Fortunately there are not many germs which multiply in the mouth. Probably diphtheritic germs do. The germ of influenza, too, probably will. These germs may remain inert, for a time, but are a constant menace to the health of the person. The normally clean mouth, the mouth which is scrupulously cared for, regularly rinsed and brushed, is in condition unfavorable as an incubator. We have in such mouths still, the necessary conditions of moisture and temperature, but not of germ-nutrition. But if the subject allows food to accumulate between teeth, there is a condition favorable to development of disease germs.

Aside from the matter of multiplying of germs, there is the consideration of storage of germs in the mouth. In a certain class of diseases, such, for instance, as scarlet fever, diphtheria and others, we find persons peculiarly constituted, who all innocently and unconsciously communicate the disease to others—formerly, to the great mystification of the physician. But such communication is not made unless conditions in the subject brought into contact with the disease-bearer be first made favorable. Hence the supreme importance of training children—and not a few adults require admonition as to these matters, too—not to put coins, pencils, any article handled by themselves or others, into their mouths. Hence the supreme importance of keeping the mouth and teeth clean. It means more, far more than the preservation of the teeth; it may mean the saving of life. Let us not fail to emphasize that.

We have had an impressive lesson in the screen pictures showing how flies breed from maggots. They come to our dinner tables and swarm over the food with their feet loaded with germs. Swat the fly! The great point in fighting these infectious diseases is to secure and preserve conditions of cleanliness. Personal cleanliness must be inculcated. Dirt is *not* healthy, unless it be nature's soil. First of all in importance is to guard the mouth, and see that it is kept clean.

With All Due Deference

Why is it, Araminta, that
Instead of feathers, in your hat
You now wear long antennæ?
Why, all the plumage do you strip
Throughout their length, except the tip—
And why do you leave any?

I know man's sense of art is small,
When he has any sense at all,
However he may bluster.
Then teach me how to train my eye
Till all the beauties I descry
Of moulting feather-duster!

—*Lippincott's.*

ORAL HYGIENE*

BY C. A. NIXON, PH. D., D.D.S., VALPARAISO, IND.

IN CONSIDERATION OF ORAL HYGIENE in our daily practice, we might say that patients represent the negative quantity, bringing to us as they frequently do the predisposing causes which promote the opposite of a much-to-be-desired condition. The first of these predisposing causes is negligence on the part of the patient; second, irregularity of the teeth; third, faulty fillings, unsanitary bridges and crowns. There is still another cause which is failure upon the part of the dentist to instruct the patient how to care for the mouth and teeth after they have once been thoroughly cleaned by him; failure to emphasize the great importance of keeping the mouth in a hygienic condition, and of visiting a dentist at least four times a year for examination and further instruction.

However successful we may be in convincing our patients of the dangers that lie in store for them, we shall meet with poor results unless they co-operate with us in seeking the ounce of prevention and in using yards of self effort. You will all admit that no matter how earnestly you impress the lesson upon your patients or how sincerely you plead with them to use the simple means suggested, that there are always a few who are heedless and remain forever a negative quantity. The number in this class, I am beginning to find, is quite small, and lest we are unable to detect the few careless ones, we should continue to urge a hearty co-operation from all.

Oral Hygiene, like many other subjects in this progressive age, might well be termed reformatory, and, like all reformatory movements, its best work and best results are seen in the resultant effect upon the children rather than the adult.

It has been my custom with my young patients, in late years, to build a foundation for future hygiene of the mouth. This, as you know, must begin first with a thorough examination, and I have designed a special explorer for this purpose. When a young patient presents himself and has told me his troubles, the special explorer is put into use, by going carefully around all of the teeth just under the free margin of the gum. I have many times found in the mouths of children as young as twelve, a deposit similar to that in the tooth of an adult, though not a single trace of outward symptom was there to invite inspection. The seed of destruction is planted to be fertilized through our oversight, which is likely to occur.

A child comes to your office with a simple occlusal cavity and a note from the parent saying, "Fill with silver." It doesn't take long, no great amount of decay and the general appearance of the mouth is good. The tooth is filled, the child dismissed and may not have occasion to call on the dentist for three or four years, as is the case many times. The little calculus deposits have grown and spread and a most deplorable condition drives the child, now almost a young man, back to the dentist. You may say, what has this to do with practical oral hygiene? It means that we must be unceasing in our investigation—this is the foundation upon which we must build our monument of sanitary science.

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*Read before the Northern Indiana Dental Society.

We must, first of all, be original and employ a system by which to work. It has been my privilege to investigate a great many different methods or systems of mouth and teeth cleaning. Some proved practical, others not. However, these systems or methods helped in solving the problem, in a measure, for me.

The proposition of scaling the teeth was a stumbling block for me, having bought many sets of instruments, designed by different men, adapted to their hands, and, no doubt, in their hands were the acme of perfection; but to me the majority of them were useless. I began to realize the necessity of originating my own instruments. For this purpose a piece of 16-gauge copper wire is used, drawn down to a keen edge of sufficient length to permit the twisting and bending to any desired shape. A location on the lower, left first molar, lingual surface is selected to be scaled. The straight copper wire is directed to that location, the mind's eye quickly designs the shape of the instrument to reach that surface, then with your pliers, twist and bend your wire, fitting it now and then until it is perfectly adapted to this surface. Take up one of your discarded instruments, heat it red hot, put it down in about two pounds of flour of pumice and one ounce of linseed oil, previously mixed. Allow it to cool slowly, then draw it straight and shape the same as your copper design, smooth down and polish. Now it is ready for tempering. Heat it red and as the color is racing back and forth from red to deep purple, the copper-like color with deep orange about one-half inch back from point, plunge it into linseed oil and you will have a hardness sufficient to withstand the pressure of scaling and not too brittle. It will take about eleven instruments in all, and these are yours, your hand, mind and eye are familiar with them, and you will succeed better than with a set of foreign origin. Not casting a single reflection on any man who has placed a set of instruments on the market for our use, but those of our own origination serve to make us more competent.

The natural tendency in scaling is to go too fast, not content to stick to one tooth until it is clean. The temptation to get to those large pieces of calculus ahead will sometimes lure you into skipping about from tooth to tooth, and the first thing you know, you have overlooked some deposit in a dangerous location. Before beginning the scaling process, it is necessary to have your sterilizing solution ready. I know of none better than 40% of formalin and borax (the latter to prevent any corroding effect upon the instruments) an alcoholic solution of phenol, and a glass of water. Place your instruments in the formalin, then in the phenol solution, from this into the glass of water, well up on the handle. Now they are ready for use. Select your tooth to be cleaned, the starting point for me is the lingual surface of the lower third molar (if present). Stay with this member until you are satisfied it is scaled thoroughly, and as many more likewise as time will permit, starting at the same point to polish. The polishing process is done by a special instrument, in which you may place wooden points, previously saturated in hot liquid vaseline, which prevents the point from being saturated with saliva and becoming bristly or broom-like, and the flour of pumice will adhere and carry better to the place to be polished. Polish until you are unable to detect any dragging sensation; you are then quite sure to have removed all calcific deposits and dead peridental membrane. If you have compressed air use it at this time, and, with a strong syringe, flush the tooth and tissues well with any good solution. I use alcohol, ½ ounce, water 2 ounces, and glycothymoline one ounce, for its color assists in helping to mask the hemorrhage which often disturbs the patient.

Silk floss is now used to polish between the teeth, the contact point, many times, prevents us from getting into this locality, excepting with a jump, which, in my opinion, is injurious. To get around this difficulty, you may take a celluloid strip, such as is used in manipulating plastic fillings, make a needle, forming the eye with the dam punch for bicuspids. Thread in your floss and, with your pliers, gently pass your celluloid needle through the interproximal space, carrying your floss through, remove the celluloid needle, fill your space with flour of pumice and proceed to polish.

If it is necessary to use any medical treatment, it should be of an astringent nature, and a most convenient instrument with which to do this may be made from a quill toothpick. With your knife chip out a small opening about ¼ inch from tip and then split the point up to the opening, making a pen. Dip into your solution and carry to place, gently passing it down along side of tooth to be treated. These points will spread and the solution will drain off, down under the gum. The teeth and gums should be kept dry by use of cottonoid rolls. A very good solution is Buckley's

℞	Potasii iodidi	ʒ i j
	Iodi (cryst.)	ʒ i j s s
	Zinci phenolsulphonatis	ʒ j j
	Aquae	f ʒ v j
	Glycerine	f ʒ i i j s s

Sig.—Use as directed.

During the course of treatment I have dwelt upon the importance of the patient's co-operation and the necessity of cleaning the mouth regularly. Hot solutions of bicarbonate of soda, one teaspoonful to one-half pint of water, mornings, followed by gentle massaging with the finger tips will, so surely as it is done, bring results most gratifying to yourself and the patient.

THE OHIO STATE DENTAL SOCIETY AS REORGANIZED

EDWARD C. MILLS, COLUMBUS, OHIO

The first attempt to increase the prestige of the Ohio State Dental Society through organization of component societies was the result of a motion by Dr. L. P. Bethel at the 1888 meeting of the society, when a committee, consisting of Drs. L. P. Bethel, chairman: C. R. Butler, A. F. Emminger, H. H. Harrison and J. Taft, was appointed to consider the advisability of districting the state for the purpose of forming district societies, the committee to have power to act. As a result of their labors the state was divided into eight districts as follows: The Central District No. 1, to occupy the central part of the state; No. 2, the northwestern; No. 3, the northern; No. 4, the northeastern; No. 5, the eastern; No. 6, the southern; No. 7, the southwestern, and No. 8, the western (*Dental Register,* Vol. 43, p. 208). But two societies were organized, the Second District Society at Toledo, November 29, 1889, and the Seventh at Dayton, May 21st of the same year. (*Ohio Journal of Dental Science*, Vol. 10, p. 55; Vol. 9, p. 572.)

Dr. J. F. Stephan in his presidential address before the society in 1904, strongly urged the organization of district societies, displaying a map of the state (DENTAL SUMMARY, Vol. 26, p. 590), outlining territory for formation of ten district societies.

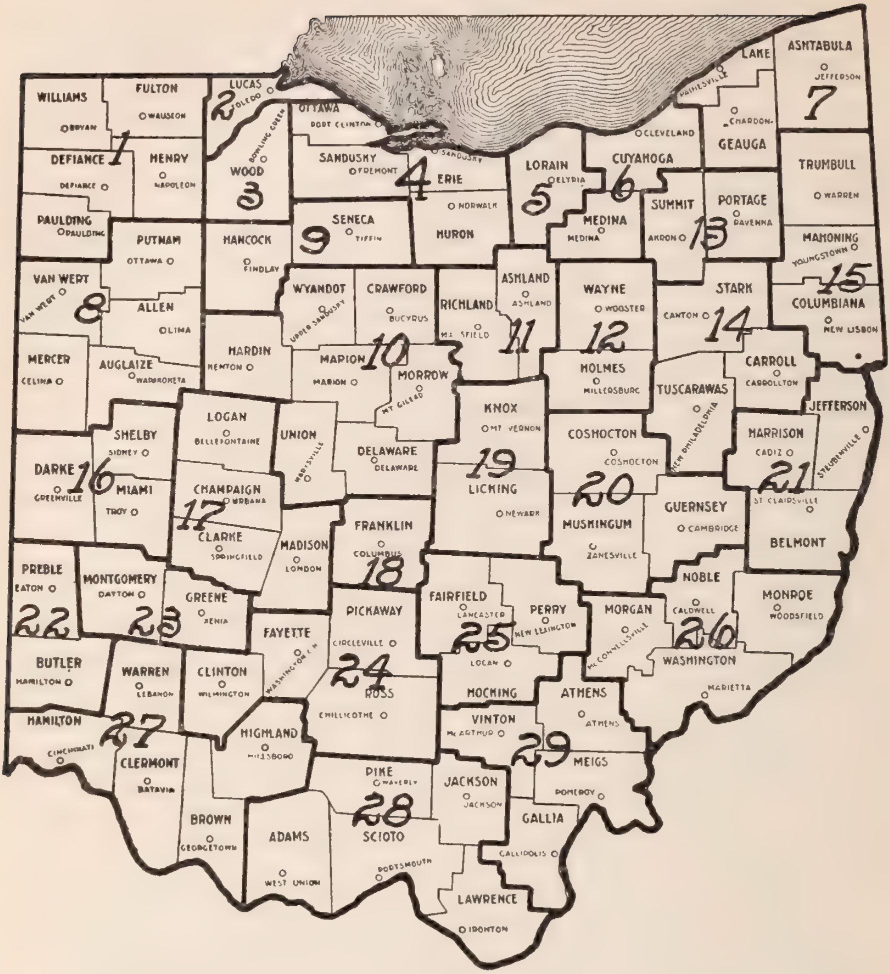
At the 1905 meeting Dr. J. Taft moved that a committee of three on organization of local societies be appointed. The president, Dr. W. H. Todd, appointed Drs. A. E. McConkey, S. D. Potterf and W. D. Snyder. No report is found from this committee.

At the 1906 meeting of the society Dr. W. H. Whitslar introduced a motion that a committee of five be appointed by the president, Dr. H. L. Ambler, to make necessary changes in the constitution and by-laws. The following committee was appointed: Drs. H. C. Brown, F. R. Chapman, L. P. Bethel, W. H. Whitslar and H. C. Matlack. Dr. Brown, upon election as president of the society, resigned membership on the committee, appointing Dr. Ambler in his stead as chairman.

At the 1907 meeting the committee recommended an entirely new constitution and by-laws and the re-organization of the society along the lines of the Illinois State Society. The proposed constitution and by-laws were then read and explanatory remarks made by Dr. Arthur D. Black, of Chicago. On motion they were adopted as read without a dissenting vote.

The various committees on organization have disposed of the eighty-eight counties in the state, into twenty-nine component societies, a list of which with the present (June 1, 1914) officers follows.

Societies marked "reorganized" were in existence, in some instances, with a different name and jurisdiction previous to 1907 and adopted the constitution prescribed for the component societies.



1. Maumee Valley Dental Society.
2. Toledo Dental Society.
3. Wood County Dental Society.
4. North Central Ohio Dental Society.
5. Lorain County Dental Society.
6. Cleveland Dental Society.
7. Northeastern Ohio Dental Society.
8. Northwestern Ohio Dental Society.
9. Hancock-Seneca Counties Dental Society.
10. Central Ohio Dental Society.
11. Richland-Ashland Counties Dental Society.
12. Wayne County Dental Society.
13. Summit County Dental Society.
14. Stark County Dental Society.
15. Corydon-Palmer Dental Society.
16. Western Ohio Dental Society.
17. Clarke County Dental Society.
18. Columbus Dental Society.
19. W. D. Miller Dental Society.
20. Muskingum-Coshocton-Guernsey Counties Dental Society.
21. Eastern Ohio Dental Society.
22. Butler County Dental Society.
23. Miami Valley Dental Society.
24. Rehwinkel Dental Society.
25. Hocking Valley Dental Society.
26. Southeastern Ohio Dental Society.
27. Cincinnati Dental Society.
28. Southern Ohio Dental Society.
29. Ohio Valley Dental Society.

ROSTER OF THE COMPONENTS OF THE OHIO STATE DENTAL SOCIETY

Meetings Suspended During the Summer Months

Butler County Society. Reorganized November 10, 1909, at Hamilton.

Jurisdiction—Butler and Preble Counties. Dues, $4.00.

Meets third Friday each month; election in December.

President—A. R. Hammerle, Hamilton
First V-President—P. A. Krucker
Second V-President—D. E. Sheehan
Secretary—Leeds Bronson, Hamilton
Treasurer—F. T. Craven

Central Ohio Society. Organized February 29, 1912, at Marion.

Jurisdiction—Wyandotte, Crawford, Hardin, Marion, Morrow, Union and Delaware Counties. Dues, $4.00.

Meets first Wednesday, bi-monthly; election in March.

President—W. E. Knight, Delaware
First V-President—G. V. Millard
Second V-President—O. M. Young
Third V-President—H. J. Nichols
Fourth V-President—T. P. Leonard
Fifth V-President—G. L. Evans
Sixth V-President—C. C. Patton
Rec. Sec'y.—O. M. Young, Marion
Cor. Sec'y.—W. A. Whitacre, Delaware
Treasurer—F. C. McGaughy

Cincinnati Society. Reorganized September 17, 1909.

Jurisdiction—Hamilton, Warren, Clermont, Brown and Highland Counties. Dues, $7.00; for non-residents Hamilton County, $4.00.

Meets last Friday; election in June.

President—Wm. Knemoeller
Vice-President—C. Stanley Smith
Rec. Sec'y.—H. E. Germann, 17 Berkshire Bldg., Cincinnati, Ohio
Cor. Sec'y.—C. W. Cragg, 22 West Seventh Street
Treasurer—J. D. Gordon

Clark County Society. Organized November 10, 1909, at Springfield.

Jurisdiction—Clark, Logan, Champaign, Madison and north part of Greene Counties. Dues, $5.00.

Meets second Monday, bi-monthly; election in September.

President—J. F. Browne, Springfield
First V-President—J. C. Longfellow
Second V-President—A. B. Kester
Rec. Sec'y.—W. E. Hoffhines, London
Cor. Sec'y.—E. B. Dibert, Springfield
Treasurer—C. M. Evans

Cleveland Society. Reorganized May 3, 1909.

Jurisdiction—Cuyahoga and Medina Counties. Dues, $12.00.

Meets first Monday; election in January.

President—T. B. Johnson
Vice-President—E. H. Shannon
Rec. Sec'y.—H. R. C. Wilson, 701 Schofield Bldg., Cleveland, Ohio
Cor. Sec'y.—Frank Acker, 5710 Detroit Ave.
Treasurer—W. C. Stillson

Columbus Society. Reorganized September 17, 1909.

Jurisdiction—Franklin County. Dues, $4.00.

Meets last Tuesday; election in June.

President—J. H. Kendall
Vice-President—Charles Swope
Rec. Sec'y.—H. C. Dean
Cor. Sec'y.—E. E. Hall
Treasurer—A. O. Ross

Corydon-Palmer Society. Organized March 10, 1913, at Youngstown.

Jurisdiction—Trumbull, Mahoning and Columbiana Counties. Dues, $4.00.

Meets second Thursday in April and October; election in October.

President—H. E. Dunn, Warren
Vice-President—T. H. Whiteside
Rec. Sec'y.—George Moore, Girard
Cor. Sec'y.—G. H. Omeroid, Warren
Treasurer—J. K. Nash

Eastern Ohio Society. Organized April 30, 1914 , at Steubenville.

Jurisdiction—Jefferson, Harrison and Belmont Counties. Dues, $4.00.

Meets first Thursday in May and October; election in May.

President—J. W. Shane, Toronto
Rec. Sec'y.—J. K. Hunter, Bridgeport
First V-President—C. S. Starkweather
Cor. Sec'y.—W. R. Shannon, Steubenville
Second V-President—J. E. Dysart
Treasurer—H. D. Grubb

Hancock-Seneca Society. Organized April 23, 1914, at Fostoria.

Jurisdiction—Hancock and Seneca Counties. Dues, $4.00.

Meets second Wednesday in January, March, April, May, September and October; election in May.

President—E. H. Sting, Tiffin
Rec. Sec'y.—A. O. Cole, Fostoria
Vice-President—G. B. Lowry
Cor. Sec'y.—C. E. Link, Bloomville
Treasurer—J. H. Boger

Hocking Valley Society. Organized August 29, 1911, at Lancaster.

Jurisdiction—Fairfield, Perry and Hocking Counties. Dues, $4.00.

Meets first Monday; election in May.

President—J. H. Stukey, Lancaster
Second V-President—J. J. Stukey
First V-President—C. W. Outcalt
Secretary—W. C. Graham, Lancaster
Treasurer—L. H. O'Grady

Lorain County Society. Organized November 20, 1913, at Elyria.

Jurisdiction—Lorain County. Dues, $4.00.

Meets last Tuesday in February, April, September and November; election in February.

President—J. G. Wherry, Elyria
Rec. Sec'y.—J. E. Betteredge, Elyria
Vice-President—J. L. Ewalt
Cor. Sec'y.—W. A. Albaugh, Oberlin
Treasurer—J. E. Trombley

Maumee Valley Society. Organized December 3, 1913, at Toledo.

Jurisdiction—Williams, Fulton, Defiance, Henry and Paulding Counties. Dues, $4.00.

Meets second Tuesday in June and October; election in October.

President—S. A. D. Potterf, Defiance
Rec. Sec'y.—G. D. Edgar, Defiance
First V-President—A. Y. Boucher
Cor. Sec'y.—H. T. Brown, Stryker
Second V-President—C. E. Smiley
Treasurer—J. D. Otis

Miami Valley Society. Reorganized November 10, 1909, at Dayton.

Jurisdiction—Montgomery and Greene Counties. Dues, $6.00.

Meets first Monday; election in April.

President—J. M. Chase, Dayton
Rec. Sec'y.—P. E. Gabel, U. B. Bldg.,
Vice-President—H. E. Routzong
Cor. Sec'y.—G. W. Riche, Dayton
Treasurer—J. A. Sinnett

W. D. Miller Society. Organized April 23, 1914, at Newark.

Jurisdiction—Knox and Licking Counties. Dues, $4.00.

Meets second Thursday in May and October; election in May.

President—W. H. Sedgwick, Newark
Rec. Sec'y.—C. L. Wyeth, Newark
Vice-President—E. C. Beggs
Cor. Sec'y.—E. N. Prior, Newark
Treasurer—W. S. Deeley

Muskingum-Coshocton-Guernsey Society. Reorganized June 26, 1913, at Zanesville.

Jurisdiction—Muskingum, Coshocton and Guernsey Counties. Dues, $5.00.

Meets second Thursday in January, May and September; election in September.

President—J. F. Knowlton, Zanesville
Rec. Sec'y.—T. E. Axline, Zanesville
First V-President—D. L. Rankin
Cor. Sec'y.—W. R. Davis, Coshocton
Second V-President—R. M. Temple
Treasurer—H. J. Boyd

North Central Ohio Society. Organized June 23, 1913, at Cedar Point.
Jurisdiction—Ottawa, Sandusky, Erie and Huron Counties. Dues, $4.00.
Meets third Wednesday in January, April, July and October; election in October.
President—C. N. Mowry, Fremont
Vice-President—J. H. Billmeyer
Rec. Sec'y.—J. K. Douglas, Sandusky
Cor. Sec'y.—Geo. B. Smith, Fremont
Treasurer—E. S. Braithwaite

Northeastern Ohio Society. Organized March 13, 1913, at Ashtabula.
Jurisdiction—Ashtabula, Lake and Geauga Counties. Dues, $4.00.
Meets second Monday; election in January.
President—K. D. Park, Painesville.
Vice-President—G. F. Bell
Rec. Sec'y.—D. E. Kerr, Conneaut
Cor. Sec'y.—J. H. Linsley, Ashtabula
Treasurer—S. H. Kimball

Northwestern Ohio. Reorganized November 30, 1909, at Lima.
Jurisdiction—Allen, Auglaize, Mercer, Putnam and Van Wert Counties. Dues, $4.00.
Meets fourth Wednesday; election in May.
President—J. W. Dimond, Lima
First V-President—A. C. Musgrave
Second V-President--R. P. Killen
Secretary—G. F. Bayley, Lima
Treasurer—J. K. Bannister

Ohio Valley Society. Organized February 6, 1913, at Middleport.
Jurisdiction—Athens, Vinton, Meigs and Gallia Counties. Dues, $4.00.
Meets first Thursday; election in February.
President—J. S. Basom, Athens
Vice-President—J. N. Brown
Rec. Sec'y.—W. S. Murray, Athens
Cor. Sec'y.—M. D. Hartinger, Middleport
Treasurer—W. W. Lee

Rehwinkel Society. Organized September 28, 1910, at Chillicothe.
Jurisdiction—Ross, Pickaway, Fayette, Clinton, and northeast portion Highland Counties. Dues, $5.00.
Meets fourth Thursday; election in April.
President—C. E. Page, Washington C. H.
Vice-President—W. W. Curtis
Secretary—F. D. Willard, Washington C. H.
Treasurer—P. F. Dixon

Richland-Ashland Society. Organized November 19, 1913, at Mansfield.
Jurisdiction—Richland and Ashland Counties. Dues, $4.00.
Meets last Monday in February, June and October; election in February.
President—C. H. Snyder, Mansfield
Vice-President—I. W. Copeland
Rec. Sec'y.—J. F. Winans, Shelby
Cor. Sec'y.—J. H. Bristor, Mansfield
Treasurer—G. W. Kenson

Southeastern Ohio. Organized October 29, 1913, at Marietta.
Jurisdiction—Washington, Noble, Morgan and Monroe Counties. Dues, $4.00.
Meets second Thursday in February, June and October; election in October.
President—T. S. Ward, Marietta
First V-President—W. M. Hart
Second V-President—John Maury
Third V-President--J. A. King
Fourth V-President—H. C. Hupp
Rec. Sec'y.—F. E. McKim, Marietta
Cor. Sec'y.—F. E. Little, Waterford
Treasurer—J. N. Smith

Southern Ohio Society. Organized September 28, 1910, at Portsmouth.
Jurisdiction—Scioto, Pike, Adams, Lawrence and Jackson Counties. Dues, $6.00.
Meets third Monday in May and October; election in May.
President—E. C. Jackson, Portsmouth
Vice-President—P. S. Chestnut
Secretary—O. D. Donaldson, Portsmouth
Treasurer—H. T. Moore

Stark County Society. Organized November 4, 1909, at Canton.

Jurisdiction—Stark, Carroll and Tuscarawas Counties. Dues, $4.00.

Meets third Wednesday; election in September.

President—L. S. Vinez, Canton
Vice-President—C. W. Potter
Secretary—A. E. Beckert, Canton
Treasurer—G. H. Phelps

Summit County Society. Organized November 5, 1909, at Akron.

Jurisdiction—Summit and Portage Counties. Dues, $4.00.

Meets first Friday; election in December.

President—C. E. Smith, Akron
First V-President—E. C. Branch
Second V-President—O. A. Hille
Rec. Sec'y.—H. O. Wearstler, Barberton
Cor. Sec'y.—H. W. Barton, Akron
Treasurer—B. B. Pontius

Toledo Society. Reorganized November 10, 1909, at Toledo.

Jurisdiction—Lucas County. Dues, $5.00.

Meets second Friday; election in May.

President—D. A. Elwell, Spitzer Bldg.
First V-President—F. L. Olds
Second V-President—J. W. Travis
Rec. Sec'y.—T. S. Shaw, 324 East Fassett
Cor. Sec'y.—W. H. Sargent, Ohio Bldg.
Treasurer—I. A. Epstein

Wayne County Society. Organized November 24, 1913, at Wooster.

Jurisdiction—Wayne and Holmes Counties. Dues, $4.00.

Meets second Monday in January, March, May, September and November; election in November.

President—R. Elson, Wooster
Vice-President—J. H. Brown
Rec. Sec'y.—F. E. Stewart, Orrville
Cor. Sec'y.—M. I. Wesseler, Wooster
Treasurer—J. R. Weimer

Western Ohio Society. Organized November 12, 1913, at Piqua.

Jurisdiction—Darke, Shelby and Miami Counties. Dues, $4.00.

Meets first Thursday in February, May and October; election in October.

President—B. W. Jones, Troy
First V-President—W. D. Snyder
Second V-President—F. M. Pursell
Third V-President—G. E. Morningstar
Rec. Sec'y.—F. G. Rummel, Piqua
Cor. Sec'y.—P. G. Eddy, Troy
Treasurer—C. W. Sheridan

Wood County Society. Reorganized November 10, 1909, at Bowling Green.

Jurisdiction—Wood County. Dues, $5.00.

Meets second Wednesday; election in January.

President—E. R. Beatty, Bradner
Vice-President—W. H. Gernert
Secretary—E. J. Frowine, Bowling Green
Treasurer—B. Linsley

Which is more important, the hammer or the nail?

"Some cheats evade detection; but none escape reflection."

Don't let the procession of progress leave you behind.

He that is master of himself is greater than he that buildeth a Panama Canal.

EDITORIAL

INSPECTION OF DENTAL OFFICES BY THE STATE BOARD OF HEALTH

Recent amendments to the sanitary code of the State of Louisiana provide for the inspection of the offices of dentists, physicians, etc., by the State Board of Health.

The amendment states that hereafter all offices, sanitoria, parlors and other places, whether in charge of a physician, dentist, dermatologist or other person treating or in any wise attempting to cure any human ailment, shall be subject to inspection by this board.

Such offices shall be scored for points and according to the model score card, and when such offices shall fall below fifty points upon such inspection and scoring, the board will cause to be made against the person primarily responsible for the conduct of such office, charges for the infraction of this code.

To give the reader an idea of what the inspection consists, and the number of points given as perfect for the different items, we quote as follows:

Equipment—Location (2), surroundings (2).

Arrangement—Necessary rooms (1), conveniences (1).

Construction—Floor (2), walls (1) ceiling (1), light (1), ventilation (2), screens, fans (2).

Water—Hydrant (3), stationary (1), hot, abundance, (5), cool, abundance, (5).

Drinking Water and Glasses—In cooler (2), otherwise (1).

Instruments—(4).

Library—(4).

Furniture—(4).

Journals—National (2), state (1), for three others (2).

Cleanliness—Floor (3), furniture (2), walls (2), ceiling (1), doors (1). windows (1), good condition, otherwise, (2), free from flies (2), free from bad odor (1).

Instruments—(4), tables, operating, (2), chairs, operating (2), sterilizers (2), sinks and lavatory (3), toilets (3), disposition of old dressings, etc., (3).

Personal Appearance—Of attendant (2).

Dentist, Physician or Operator—Cleanliness of hands and finger nails (4), personal appearance and breath (6), general health (4).

At first thought this might seem like an uncalled for imposition, but further reflection reminds us that if there are offices of dentists or physicians that are unsanitary, they should be made sanitary. Dentists and physicians are eternally preaching and advocating *cleanliness* and hygiene and they should put it into practise in person and office. It is one of the first duties that they owe their patients and themselves.

They need to take to heart the lesson of personal cleanliness and hygiene which they have been preaching to the layman, or the pupil will outstrip the master in the very things that the latter is teaching.

No dentist should have fear of an inspection by any board of health should the enforcement of such a code become general; on the other hand, he should at all times keep his office and person in such a presentable condition that it will afford him pleasure to have people come to his office for inspection or otherwise. In these days when the most modern and sanitary equipment can be obtained, there is no excuse for any dentist to have an office in such a condition that it requires the aid of a board of health to make it a fit place for patients.

Since writing this editorial a prominent business man of Detroit told the editor of an experience he had recently in a dental office, and having a direct bearing on this subject we are going to relate it to our readers:

This man said:

"Knowing the sincere and persistent efforts of leading men of your profession to purge it of its detriments and promote it to its highest degree of perfection and standing, I desire to call your attention to an unpleasant experience I recently had, in the hope it may lead to remedial legislation or enforcement of such statutes as relate to such a condition, should there be such laws.

"It happened in a small town where I was unacquainted. I had time between trains to spare, and I regarded it as an opportunity to have my teeth cleaned. I asked the barber who was the best dentist. He said they were all good. I asked which was the most recent graduate. I reasoned such a dentist would have the newest, most up-to-date apparatus and practice the most hygienic and aseptic methods. The entrance to the building was unsightly, and the dust and dirt were thick on the stairs to the second floor, where the most recent graduate had his establishment. It consisted of two rooms—one for reception, the other for work.

"He remained seated when I entered, but arose when I told him what I desired. Then I noticed his shirt protruding from the space between his belt and vest, very much like a stevedore. His shoes were unpolished, his trousers bagged at the knees, his collar soiled, and his necktie disarranged, while his hair was long and unkempt. All of these so-called personal detriments I quickly noticed, and more especially because he was a young man, first starting.

"He said I could take the chair in the adjoining room, which I did. Then the great need of some sort of dental inspection under local, state or government supervision was impressed upon me at each successive thing I looked upon. He had his working tools on an upright tray, and they were very old, which in itself is not cause for severe criticism, but they were corroded with chemicals and rust as a result of uncleanliness. The basin of the fountain cuspidor was littered with cotton sponges and stained with blood, which gave off a pus-like hue. He told me the plumber hadn't been around to fix it, and I honestly replied it looked like the bottom of a garbage can. He wore no coat; he hardly washed his hands. His work was like his equipment and personal appearance—rotten and on a level with a cuspidor in his reception room, almost overflowing with tobacco juice. Until I saw all these things, I hadn't noticed certain blemishes on his face and neck, and you may rest assured I lost no time finding a drug store, and returning to my hotel where I used up the largest portion of a bottle of antiseptic, until my mouth felt clean again.

"The whole affair was nauseating—dirt and filth everywhere. Isn't it a sad commentary *in these days* of warfare against contagion? The question arises: Should such an establishment be permitted to continue to exist? Can't the public be protected? Would we want to go back to the common drinking cup in public places; but isn't this young dentist as dangerous a medium of contamination?

"We have many good laws restricting and regulating matters pertaining to the public health, and it may be we have some to cover the case in question; I hope we have, and link this hope to another, that, if so, they will be enforced and the public safeguarded against such a detriment to the high standards established and being maintained by the leading men of your profession."

We had no idea that in these enlightened days such a state of things existed anywhere, but if this is only one of many similar offices it seems more reasonable than we first supposed that a State Board of Health should inspect dental offices.

OBITUARY

It is with great regret that we announce the death, on June 21, 1914, of Dr. Will Bryan Conner, one of the best known, most successful and highly respected practitioners of Akron, Ohio, where he had practiced continuously since 1886.

Dr. Conner was a member of the Ohio State, the Northern Ohio and the Summit County Dental Societies; of the First Congregational Church and of the Masonic fraternity. He leaves a wife and daughter.

A fitting obituary will appear in the August SUMMARY.

SOCIETY·ANNOUNCEMENTS

Xi Psi Phi Fraternity, National Alumni Association Annual Meeting

"GOOD-FELLOWSHIP, NOT POLITICS"

Place—Rochester, N. Y.

Date—July 6. All functions will be held on this day so as not to conflict with the sessions of the National Dental Association.

Headquarters—Hotel Seneca. Register on arrival in the Xi Psi Phi Parlor on the Mezzanine. An entire floor has been reserved for our members.

Functions—Annual dinner in the large banquet hall of the hotel at 6 P. M. Members of international respect will do the toasting. Be sure to send your acceptance without further notice to Dr. George C. Lowe, 813 Chamber of Commerce Bldg., Rochester, N. Y., so that reservation may be made for you. *This is important* so that the correct number may be provided for.

The annual business session will immediately follow the banquet. Matters of the utmost importance will come up for disposal and your presence is, therefore, strongly urged.

Membership Committee—Kindly get in touch with Dr. C. C. Markey, 1436 Peoples Gas Building, Chicago, Ill.

C. O. SIMPSON, *Secretary,*
St. Louis, Mo.
L. M. WAUGH, *President,*
Buffalo, N. Y.

National Mouth Hygiene Association

ANNOUNCEMENT

A series of illustrated lectures on Mouth Hygiene is being prepared by this association for rental service.

The first lecture of the series, a talk suitable for a mixed adult audience or school pupils above the age of twelve years (designated as lecture "A") is now ready.

The lecture set (manuscript and thirty-six slides) will be furnished to members of state dental societies and others who may be considered as competent to present the matter to the public, at a rental fee of One Dollar per use.

For further particulars and application blanks address

EDWIN N. KENT, D.M.D.,
Director of Extension Lectures.
222 Washington St., Brookline, Mass., U.S.A,

Minnesota State Dental Association

This year's meeting of the Minnesota State Dental Association will be a radical departure from previous meetings in several respects. It will be held in Duluth, August 6, 7 and 8, a season when the cool breezes of the north beckon invitingly to the vacation seeker.

The clinic will be of the progressive type, which assures that every man will see every step of every clinician. The presence of such men as Knocke in removable bridge work, Prothero in prosthesis, Buell in porcelain and Weaver in pyorrhea, in addition to a number of local men, promises a meeting that the modern practitioner can ill afford to miss. There will also be a very complete manufacturers' exhibit.

Duluth, situated as it is at the head of the chain of the Great Lakes, gives one the privilege of numberless pleasure trips which can well be combined with the clinic as ideal vacations.

The Minnesota State Dental Association and Duluth hope to have the pleasure of your company August 6, 7, 8, 1914.

Very truly yours,
Benjamin Sandy, *Secretary.*

Virginia State Dental Association.

The next meeting of the Virginia State Dental Association will be held at Old Point Comfort, July 1, 2 and 3, inclusive. All ethical dentists are invited to attend.

C. B. Gifford, *Cor Sec'y.*

Sixth International Dental Congress (London)
Section X—Dental Education

The subjects for report to be followed by discussion are:

(1) The Teaching of Bacteriology for Dental Students: Methods of Teaching; Extent of Teaching. Reporters, Mr. J. Howard Mummery and

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(2) A Practical Synopsis of Medical and Surgical Teaching for Dental Students. Reporter, Dr. Godon.

(3) First Principles in Practical Teaching. Reporter, Dr. Gaddes.

(4) Methods of Teaching Orthodontics to Dental Students. Reporters, Dr. Guilford and Dr. Martinier.

The mornings of the 5th, 6th and 7th of August to be devoted to Reports, and the afternoons to Independent Papers.

The committee of the Section is desirous of obtaining names of gentlemen willing either to discuss the above subjects, or to read papers on "Dental Education."

F. Bocquet Bull, Guy's Hospital, London, S.E.
George Sheppard, 59 Merrion Square, Dublin,
Honorable Secretaries.

New Jersey State Dental Society.

The twin cities by the sea (Ocean Grove and Asbury Park) will again entertain the members and guests of the New Jersey State Dental Society. The forty-fourth annual convention of the society will be held in the North End Hotel, Ocean Grove, N. J., on July 15, 16, 17, 18, 1914, beginning at 10 A. M. on Wednesday, July 15.

The North End Hotel is one of the largest and finest on the Jersey coast and is situated directly on the beach front at the foot of Wesley lake.

Dr. Walter F. Barry, 220 Essex Ave., Orange, N. J., is chairman of the Exhibit Committee and has made an ideal arrangement of space for the exhibits. Dr. Barry will be glad to furnish information regarding the rates and space still available.

Northern Indiana Dental Society

The next annual meeting of the Northern Indiana Dental Society will be held August 28 and 29 at Culver (Lake Maxinkuckee).

O. A. VAN KIRK, *Secretary,*
Kendallville, Ind.

Illinois State Dental Society

Permit me to announce the election of officers of the Illinois State Dental Society for the ensuing year, and the place of meeting selected for 1915: President, J. M. Bareus, Carlinville; Vice-President, J. P. Buckley, Chicago; Secretary, Henry L. Whipple, Quincy; Treasurer, T. P. Donelan, Springfield; Librarian, J. D. Wilson, Danville. The fifty-first annual meeting to be held at Peoria, May 11-12-13-14, 1915.

Very respectfully,
HENRY L. WHIPPLE, *Secretary.*

Michigan State Dental Society

Resolution Passed by the Dentists of the Upper Peninsula of Michigan, June 6, 1914

The dentists of the upper peninsular of Michigan members of the Upper Peninsular Dental Society, in convention assembled, unanimously adopt the following resolution, and beg to respectfully submit the same to the honorable members of the State Board of Health:

Whereas, There exists among the people of our state an appalling lack of knowledge relative to the value of the preservation of the teeth in maintenance of health, there being but four or five per cent. of the people of the nation who recognize interdependence of good teeth and good health; and

Whereas, This ignorance of the laws of health can but result in a serious curtailment of the individual efficiency of our people, and in relation to the coming generations, through this economic loss, it amounts to immeasurable waste of our state and nation's best asset, viz., the health and the lives of our children; and

Whereas, Our great state of Michigan is far from the front of this forward movement—this vigorous and healthy procession to be found in other states, which is bringing to other communities that health and well-being to which we, too, have a right; therefore be it

Resolved, That the dentists of this convention do most respectfully and urgently request members of the State Board of Health to use every honorable means to secure the appointment of a competent person to be known as State Lecturer of Oral Hygiene and who shall be under the supervision of said board; and be it

Resolved, That a copy of these resolutions be forwarded to Dr. Edward T. Abrams of Hancock, member of the State Board of Health from the Upper Peninsula of Michigan.

(Signed) E. O. Gillespie, *Chairman*,
R. H. Banks,
R. W. Boyer,
Committee.

Montana State Board of Dental Examiners.

The Montana State Board of Dental Examiners will hold their annual meeting in Helena, Mont., July 13 to 17, 1914, inclusive. All applications must be in the hands of the secretary ten days prior to the opening of the meeting. Examination and license fee, $50. For other information and examination blanks address the secretary,

Dr. Gilbert A. Chevigny,
Clark Block, Butte, Mont.
Dr. Ralph R. Rathbone, *Pres.*,
Dillon, Mont.

North Dakota Board of Examiners

The next regular meeting of the North Dakota Board of Dental Examiners will be held in Fargo, N. D., July 13, 14, 15 and 16, 1914. All applications must be in the hands of the secretary by July 3, 1914. For further information apply to F. A. Bricker, *Se'cy.*,
Fargo, N. D.

In choosing books, select those that make you think rather than those that do your thinking for you.

A book is worth much or nothing; it is either good or bad. No book is worth anything that is not worth much—*Ruskin.*

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

Men Who Are Making Dental History

OTTO U. KING, Huntington, Ind., President Indiana State Dental Society; Secretary National Dental Association; six years Secretary Indiana State Dental Society; ex-President and Secretary Northern Indiana Dental Society; formerly Trustee Indiana State Dental Society.

Born in 1873 , Dr. Otto U. King has had forty years of about as active life as ever falls to the lot of man. As a farmer boy he won many a battle with potato sprouts and, perhaps, lost several to that old, familiar foe to youthful felicity, Hickory Sprout; the windings of the pasture lane and the deadly dreary rectangles of the corn field are alike well known to him; he has had his full quota of frostbites and stubbed toes.

Graduating from the farm "along about that time," he entered and was graduated from the high school, "done time" in the Indiana State University, and earned his D.D.S. at the Northwestern University Dental School in 1897.

Doctor King is an organization man from top to toe. Everything he undertakes is put through with vim and vigor——and he never hesitates to tackle any bit of work that comes his way. In recognition of his work in furthering the reorganization plan of the National Dental Association in his state he was last year made secretary of the national body.

In contradiction of the ancient saying: "A prophet is not without honor save in his own country," Doctor King is loved and honored by those who know him best, as was strikingly exemplified at the 1913 meeting of the Indiana Society, when a valuable diamond ring and a beautiful cut-glass vase were presented to him by members and friends in celebration of the completion of his fifth year as secretary of that body.

Doctor King very modestly says of himself: "I have learned by experience that ability counts for less than zeal. The man who wants to win in his life work must give himself to his work, body and soul." Our experience has taught us that zeal without ability is only a trifle less fatal to success than ability without zeal. Both are needed—One is the Know How the other is the Do. Doctor King's life thus far has shown that he has both quite largely distributed through his cosmos.

Dr. King owes much of his success to the keeping constanlty in mind as an ideal this motto: "Whatsoever you do in dentistry, do all for the uplift of humanity."

In the fields of activity outside of dentistry, Doctor King holds trusteeships in five organizations and for six years was secretary of a large newspaper publishing house in his home city.

Doctor King is a genial, kindly, whole-souled man whom it is a pleasure to know.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXIV AUGUST, 1914 No. 8

OFFICIAL ORGAN

The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. Bethel, M. D., D. D. S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

SOME PERPLEXING PROBLEMS IN CROWN AND BRIDGE WORK*

BY W. O. HULICK, D.D.S., CINCINNATI, OHIO

I HAVE THE HONOR to present for your consideration a paper which will be a review of crown and bridge work up to date, with the object in mind to enter into a general discussion of some of the perplexing problems we see in our every-day work.

So much has been written upon this important branch of our work that one cannot hope to present anything startlingly new or original. I will, therefore, direct my thoughts to methods of procedure worked out by men of mechanical and manipulative ability and urge those of you who have not, to adopt and help to further perfect them rather than to look to theories and methods, the character of their practicability, which seems to be doubtful, and to impress upon you the satisfaction obtained and the extent to which my practice has been revolutionized in the past few years by adopting systems which offered and insured the best results obtainable.

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*Read before the West Virginia State Dental Society, 1913.

Now, inasmuch as results are the all-important factor, and, inasmuch as they are not always obtained, (and especially is this true of a large percentage of our colleagues), it will be necessary to intersperse my message to you with some comparisons for which I wish to apologize. It is a delicate point to touch upon, and as I do not wish to be misunderstood in this connection, I will explain that it is not critical in the least; but to make some observations of incorrect technic and application, which will more forcibly call to your mind some of the wonderful opportunities present day possibilities afford for more correct technic and application, which will insure to you, as they have to me, results heretofore thought to be impossible.

Observations have led me to believe that good judgment is not always exercised in the selection of cases, and that skill in the application of systems and methods of procedure is lacking to an alarming degree, which I will illustrate to your satisfaction by means of slides later on, and that great reforms are forcibly indicated, there is no question. It would seem reasonable to suppose, owing to the superior knowledge we have today, that all dental operations of a mechanical nature would be carried to scientific completion according to cosmetic, mechanical and pathological requirements; that this is not so to a greater or lesser degree, we must admit. Therefore, it will be necessary to deal with the subject from different angles, reviewing the past, looking at the present as it is, anticipating the future.

Our ideals are different, likewise our viewpoint; we have difference of opinion, which is our privilege; some have knowledge and good judgment associated with mechanical and manipulative ability; there are those who have the latter while the former has been questioned at times, and vice versa, and unfortunate is he who does not possess these qualifications, although he works hard to attain them.

It is not essentially my purpose, therefore, to point out to you rules and methods of procedure that are imperative. On the other hand, it is my pleasure to present some of the many improvements that have been gratifying to me and satisfactory to those I have had the honor to serve. Recognizing and being ever mindful of the obligation we owe the patient, who properly profits mostly by improved methods and simplified technic, I am grateful to those who have successfully helped to lighten the burden of the dentist and diminish the discomfort usually attending any dental operation.

Granting the advancement made in all dental operations, which will insure greater satisfaction to the dentist, a longer and better service to the patient, there still remain two factors absolutely essential and imperative.

First—We are morally bound to render a service to the best of our ability, a service justly due to the patient.

Second—Those we serve are morally bound to protect our efforts against undue usage and uncleanliness so as to insure for themselves the longest possible service.

Of the first part I wish to say, we should observe the Golden Rule as nearly as possible, rendering a service for our client as we would have it performed for us under conditions as they exist, whether favorable or otherwise. The patient is trusting, too much so at times, I fear. How are patients to know whether a crown is well adapted or not? What knowledge have they as to the adaptation and occlusion?—very little—in fact, all they have is confidence, which, gentlemen, is misplaced many times, placing the ever-trusting patients completely at our mercy, having no thought of the danger they are in at times by faulty adaptation of crowns and bridges. If you will pause for a moment, we will tell the patient what all this may cause:

Irritation at gum margin from bands that do not fit; inflammation on ridge from faulty adaptation of supplies, which impinge and form pockets that collect food particles and saliva to decompose, making a home for all kinds of micro organisms to be washed into the stomach; poor occlusion and misapplication of force, which in time, because of abnormal and unsanitary conditions, induce gingivitis; bleeding gums; putrid sore mouths, resulting many times in oral sepsis, which is particularly severe and hurtful in its effects, for this sepsis produced by these abnormal conditions are dammed up in the bone and in the periosteum and cannot be gotten rid of by any antiseptic or instrumentation which the patient or dentist can carry out, except in loss of tooth, which is almost sure to follow. Many times, aside from a slight soreness accompanied by bleeding, this condition is at first painless, steadily accumulating in intensity without drawing particular attention, resulting in either anemia, gastritis, colitis, obscure fever or purpura, nervous disorders of all kinds, chronic rheumatic affections or kidney diseases.

It is for the dental profession to solve this important problem to the interest of public health and it is for this reason and no other, that my writings are directed to comparative work, for my observations have led me to know that a large percent of our profession is steadily engaged in combating successfully with these problems, first, by adopting systems and perfectly adapting them; second, by educating the public in oral hygiene and sanitary conditions that will prevent oral sepsis.

My observations also lead me to know and deplore the fact that another percent of our profession is steadily engaged in promoting sepsis of the worst character and degree, ignoring the fundamental truth connected with the anatomy, physiology and pathology of the tissues with which they deal.

Now, gentlemen, the masses take it as a matter of fact that we are all capable and trustworthy; they are too busy with their own affairs to doubt that this is so, and it is our duty to so conduct our professional obligations as not to betray that trust.

The aforesaid conditions are largely due to operations of the past and by operators who were ignorant of correct technic, mechanical requirements and the pathological disturbances which were directly due to poor dental operations. At the present time, crown and bridge work is beginning to be so perfected and a greater percent of dentists are profiting by past experience that helped to cause the deleterious conditions, that in the future these conditions will almost entirely disappear.

That crown and bridge work is a necessary replacement and can be and is made by thousands of our dentists absolutely perfect and durable, there is no doubt; also that the oral hygiene movement is helping wonderfully to further improve oral conditions by teaching the public how to clean their mouths and teeth and how to keep them so.

Of the second part above referred to, I will say, in behalf of those we serve, that they should be taught to use and abuse the possibilities and probabilities, the amount of service expected, length of time crowns and bridges or other replacements are expected to last. I believe a patient has a right to know, or should have the knowledge to be able to judge, a good service from a bad, for it is my belief that not half of those we serve know a good service from a bad. I also believe that the demand for better service is greater (by the masses) from day to day, and I am also constrained to believe that when the aforesaid has been carried out, those we serve will appreciate and reciprocate by fulfilling the obligations they really owe us.

The dentist and patient are jointly responsible for a too-universal adoption of bridge work, especially in large restorations and under conditions where it is contraindicated. The term "fixed bridge work" seemed to fill a long-felt want in the minds of dentist and patient alike, for it could be permanently fixed, cemented to place, so that it would "never come out," which appealed to them, especially to the patient, as being nearer akin to natural teeth, and after a time the wearer becomes unconscious of their presence in the mouth. The term "false teeth" is extremely repellant to most people and the fact that they must be removed frequently for cleansing is a constant reminder that they are "false teeth" and they never forget them; also they were unfortunately advised, as many dentists justly believed years ago, and unfortunately, many do now, that a cemented bridge was and still is just as good as the natural ones and would last the remainder of their lives. In this they felt perfectly secure, not alone as to the usefulness and durability, but also as to cleanliness and health.

At the present time we are all agreed that some patients would be better off without bridge replacement and that poor judgment in selection of the case by the dentist, or over-persuasion on the part of the patient for reasons aforesaid, are responsible for the act. We should not condemn this form of replacement, however, for replacements of some kind are a necessity for proper mastication, and just as long as the teeth are lost by whatever cause, just so long will crown and bridge substitutes be constructed, even to the end of time.

With the loss of teeth from any cause, many changes occur, making abnormal conditions perplexing problems for any form of replacement, and especially is this true in Riggs' disease cases in advanced stages.

Some of the prohibitive cases for bridge work are where teeth are elongated, because of no antagonism. Other cases almost prohibitive are where teeth are malposed which puts them out of occlusion and alignment. All of these conditions should be more thoroughly understood by both dentist and patient.

Each case presented should be individual; we should prescribe treatment as a physician would prescribe, according to conditions. Study models should be made after thorough prophylactic treatment, and all teeth have been put in good order, with notations to plan a method of procedure that will give the longest and best service, either fixed or removable.

Some of the unfavorable conditions would be abscessed teeth that have been treated but are still sore, indicating probable short-time service; teeth not deeply rooted; also a span which is too long for two teeth as abutments to carry. Another feature, probably the most important one in this connection, is diseased condition of the teeth and gums that is chronic, and especially is this true in all unsanitary conditions or where the individual habits are careless, for if so, it will follow that they will be more so with bridge work.

We must look into another and not the least important of the many points to be observed and that is the force applied, or pounds pressure in the act of mastication. It would naturally follow from the knowledge that we have in this connection, that all bridge work is temporary inasmuch as each tooth was expected by the Creator to do its own work and no more; however, experience has taught us that two good strong teeth will give a long service carrying two supplies, provided the superstructure is well adapted and the occlusion is natural.

I would like to call your attention to the amount of service required of natural teeth; *first,* they are expected to prepare perfectly three meals each twenty-four hours, an act that takes from 800 to 3,000 triturations or closures each meal, and according to size of meal, occupation or environment of the individual. Now, to properly chew food, especially meat, the trituration will be from forty to sixty times each morsel or bite, and the stress exerted will be from ten to fifty pounds or more, according to individual habits. Calculation will give number of closures and the great amount of service required at the year's end, which is perfectly natural, and is performed regularly as all other functions are performed, without a feeling of discomfort so long as they are in good health and a normal condition.

From these notations we must conclude that the teeth which support a bridge are required to bear more force and pressure than nature intended; where the place is large, many times more—and the bridge being permanently attached, at no time can any rest be given the abutments or the contiguous parts by its being removed. Thus it would seem a violation of all the laws of nature to expect four teeth with caps or crowns to support a piece of bridge work of fourteen teeth.

Bearing upon the requirements in this particular, it has been stated by some authorities, that by uniting two or more teeth the movement of each is so modified and restrained as to enable them to successfully withstand more force than the sum-total of their separate resistance. I do not believe that nature will strengthen teeth so engaged to accommodate our method of misapplied force that is unnatural and unreasonable in their demands for proper mastication. The force of the bite or the pounds pressure with which the jaw may be closed upon an object, as before stated, varies greatly among different persons, and is dependent in larger degree upon the peridental membrane, and upon personal habits in the use of the teeth in mastication, more than upon muscular force. In this connection, where a fixed bridge is employed for mastication, the force of the bite of an individual is modified from time to time, pounds pressure becoming less and less as the teeth engaged as supports, weaken, with the usual consequence, premature loss of supports.

It would naturally follow that to get the greatest possible service from bridge work it must be constructed on natural lines—cusps to fit into cusps so as not to force themselves or their antagonisms out of alignment or occlusion; bands must be properly adapted to neck of teeth to be used as supports, conservation of supports by not overloading them with too many supplies, and at no time placing fixed bridge work in unsanitary mouths or where teeth are loosened from decay or diseased conditions.

Another important feature to observe in crown and bridge work at the present time is the being able to conceal the artificial to an appreciable degree without sacrificing masticatory requirements.

Single porcelain crowns are so accurately adapted as to almost defy detection; however, experience has taught us the inadvisability of all porcelain bridges, and those who were over-enthusiastic when this form of bridge work was first introduced, were compelled to discard it as impracticable, as porcelain does not possess integral strength necessary for mastication.

Since the advent of bridge work, superstruction of metal has been employed with teeth attached by some form of metal pin baked in the porcelain, and experience has taught us from frequent fracture and difficult repair, the advantage of porcelain as strong as possible, which can be obtained only in the replaceable form of teeth, thereby enabling us to use more porcelain and less gold without sacrificing either of the aforesaid requirements to any appreciable degree, and making at the same time easy repair possible without disturbing the superstructure—an advantage very essential in all bridge work.

This method is almost universally adopted, employing the casting process, which means easier and better adaptation by some operators, which is absolutely essential; however, the swaging process has many advantages in some technic we are free to admit. It has been experienced by many, that cast metals are not, by comparison, as strong as melted or rolled metal, therefore, I would recommend strengthening all cast portions where great stress is exerted.

Believing as we all do, the necessity for accuracy in adaptation and utility in strength, combined with the cosmetics, and that all porcelain teeth or porcelain facing should be employed within the line of vision wherever possible, we are also agreed that changes take place in many mouths from early extraction or loss of teeth from whatever cause, or wearing down of the natural ones, which would make the above-named course of procedure a great sacrifice of strength and utility under masticatory stress. It is, therefore, my practice, to take the "middle of the road" plan, i. e., the safe and sane plan of strength and utility even though I am obliged to sacrifice appearances to some degree.

Now, inasmuch as we are victims of circumstances in the loss of teeth, as we also are in the loss of any other part of the body, consequently, the three prime factors in crown and bridge work replacements are perfect adaptation, which means longer and better service, stress to resist the great amount of service required, and appearances, or the cosmetics, whereby the artificial can be concealed to an appreciable degree.

We will now look into some of the different forms of replacements, taking up the straightening of single gold and porcelain crowns first. There is no plausible excuse at the present age for faulty adaptation of single crowns and the adaptation of the different forms of all porcelain teeth with dowel, which can be made so perfect by grinding base to tooth root, also shape and contour, as to almost defy detection. The casting method plays a big part in this line of work for roots that are irregular from decay or fracture or from any reason, such as inability to grind surfaces to fit.

Regarding bands for the single crown, many operators differ in opinion even though they fit perfectly, and be that as it may, good results—lasting results—if you please, are obtained either way with only occasionally a split root, which may and has happened with or without band, and is usually due to faulty occlusion or accident, and not from method employed. It is, therefore, my opinion that inability to fit a band properly is the only real reason for condemning them, either for porcelain teeth or gold cap crowns.

The most important feature in crown work, where bands are used, is root preparation, and it is probably sadly neglected by most operators to an alarming degree, and observations have led me to know that faulty preparation seems to be the rule and perfect preparation rare. Unless the root is prepared perfectly, no band can be adapted, and unless perfect, it is the same in effect as any foreign body, objectionable to the tissues and nature tries to get rid of it.

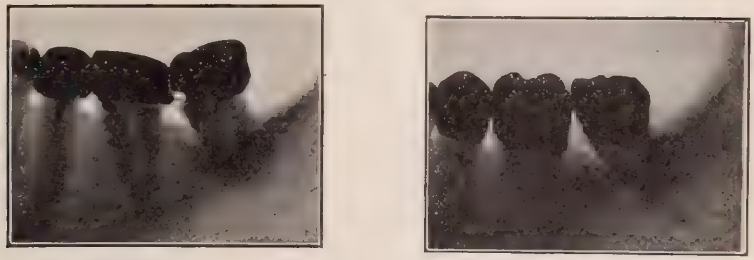
To what extent radiography will be used in this connection I do not know. However, will say at this time, many unfavorable disclosures have been made which have helped me in many ways to improve my technic so that it is my pleasure at this time to make a perfect gold crown, which I am happy to show you on this occasion. I believe it is the negation of all the truths of nature to improperly place bands on the roots of teeth and to impose too much work on abutments and in mouths hopelessly unsanitary. Where mouth hygiene is doubtful, the pathological conditions unfavorable, bridge work of a removable nature should be employed, or some of the different forms of attachments employed on partial dentures, not alone because of better sanitary conditions, but also to equalize force. Recognizing as we must the stress in pounds pressure in the act of mastication, and the number of triturations, it would naturally follow, where the restoration is large, it must be made removable in some form so that the ridge being covered by a saddle will receive and resist most of the impact, the teeth serving mostly to hold the piece in position.

The saddle will also partially resist lateral action in trituration, as the natural mobility in time has a tendency to loosen teeth attached as supports.

As to the hygiene condition by comparison as between fixed and removable bridges or partial plates, if you please, if the abutting teeth have been well prepared, all things being equal, there seems no difference in my mind. It has been my good fortune to see twenty-five or more methods of removable bridges and to have adopted some successfully in well-selected cases. However, it is my belief and advice that no man should undertake this line of work unless he has unusual mechanical and manipulative ability, as the technic is intricate and unless perfect in every detail it will fail absolutely. Probably the casting method has benefited us more than any other of all the improvements, and to what extent it is and will be used in crown and bridge work depends largely on technic in adaptation, which, at this time is not entirely satisfactory for fixed bridge work, where it is employed in the form of inlays for attachments. I cannot go into a discussion of this method for want of time. Of the many forms of bridge work in use today and variations of conditions presented for advice, adoption and construction, I can only say that inasmuch as each case is individual, which calls for different treatment and application, a man must use good judgment and use only the method he is capable of carrying to a successful completion. I do not think it wise or feasible for a dentist with ordinary ability to undertake methods of procedure, the practicability of which, as stated before, would seem doubtful to them at least, and which could only be carried to a successful completion by men expert in these particular lines.

I would, therefore, again urge anyone in doubt to improve his technic and knowledge of application and continue to employ methods within his capability, for the object, after all, in our life work, is service—the best we can do, and for the longest possible time.

Interpretation in our work plays no small part in all dental operations. Consequently, as mentioned elsewhere, it is not my object to dictate to you methods that are imperative, neither do I wish you to misinterpret my message as moralizing, for far is it from my mind to point out the mistakes of my brother for any reason whatsoever other than for our general uplift and for the good of humanity, the people whom we have the honor to serve to the best of our ability.



Cuts No. 1 and No. 2 have been used before in THE SUMMARY. It is most unfortunate, yet true, that No. 1 is typical of thousands of gold cap crowns seen today. No. 2 is the correction of this same case, and there seems no logical reason why all crowns are not adapted in like manner.

The writer has many radiographs to illustrate these two conditions, however, this evidence will be sufficient.

PATHOLOGICAL ORAL CONDITIONS AS A SOURCE OF SOME SYSTEMIC DISTURBANCES*

BY HOMER C. BROWN, D.D.S., COLUMBUS, OHIO

THE OPPORTUNITY OF PRESENTING this paper before the Columbus Academy of Medicine is fully appreciated, since I am convinced that the discussion of such subjects as have an interdependent relation to the physician and the dentist will work a very distinct advantage to both and be of special value to the laity.

In order to better establish my position relative to this interchange, I quote from a paper which I read in December, 1912, before the Ohio State Dental Society, as follows: "Generally speaking, the medical profession has only recently begun to look to the mouth and teeth as a source of some of the pathological conditions which they are called upon to treat, and we should be ever ready to co-operate with them in correcting such conditions, as well as in other matters of mutual interest to both professions and the public. It is certainly appropriate for our local, state and national organizations to invite the general medical practitioner, the specialist or the surgeon to contribute to our programs, and with some modesty, we say that similar medical organizations might well consider the advisability of inviting the general dental practitioner, the orthodontist or the prophylaxist to participate in their programs. I am impressed with the conviction that such interchange of ideas and courtesies cannot fail to be of mutual interest to all."

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*Read before the Columbus Academy of Medicine.

Fortunately, it is becoming more generally recognized that many diseases have their origin through some obscure and remote chronic infection, which must be definitely located before successful treatment is possible. The establishing of a correct diagnosis of any pathological condition is the first and most important step for the physician or the dentist, and it is needless to say that the patient's interest is best served when this is accomplished.

I recently heard Dr. Charles W. Mayo make the following statement with reference to the mouth: "Looked at from every standpoint the mouth may be said to be the greatest portal of entry for pyogenic organisms. Many species and varieties find a foot-hold in the tonsils, lymphoid tissue of the pharynx and about diseased teeth and gums." He referred to a routine examination of the mouth, teeth, tonsils and saliva of 334 cases of gastric disturbances of which 60 per cent. presented pathological oral conditions, and stated that the worst infected mouths were associated with the most aggravated stomach cases. He says that the mouth is the most infected part of the alimentary canal and cites statistics to show that bacteria found in mouths of patients under observation are also found in the intestines. He further says: "The next greatest step in medical progress in the line of preventive medicine should be made by the dentists. The question is, will they do it?"

As president of the National Dental Association I am prompted to answer this question in the affirmative, but in doing this I fully appreciate that we should not only have the hearty co-operation of the dental profession but also that of the medical profession. Plans were well under way at the time the statement was made by Dr. Mayo and have been fully developed since then, which, supported by our re-organized national, would seemingly indicate success. Our national association has only recently reorganized along lines similar to the American Medical Association and we feel confident that we will soon have 15,000 of our progressive and aggressive dentists as members. We have a Scientific Foundation and Research Commission, consisting of twenty-seven members, headed by the president of the Ohio State Dental Society, Dr. Weston A. Price, of Cleveland. This commission is now at work in an effort to solve some of the unknown problems which have not only confronted the dentist, but have also seriously handicapped the physician in treating many systemic diseases where pathological oral conditions were the source of infection. We bespeak the good offices of the medical profession in rendering such assistance as they can from time to time, since we appreciate that by this co-operation much benefit will result to all. We now have four research technicians at work; two at the University of Minnesota, one at the University of Michigan and one at the Case School of Applied Science. We hope to place others in this special field of work just as soon as funds and developments will permit.

It may be interesting for you to know that it is the purpose of this commission to raise funds from the dental profession to carry on this work. In doing this the support of the organized dental profession has been urgently requested, by annual contributions to this fund for a period of five years. It is thought that after the importance of this is better understood, and the work well established, sufficient interest will be manifested to make possible the securing of endowments similar to what has been done in medical and other important research investigations. This dental research movement will have a strong tendency to stimulate and advance our profession and this, in its final analysis, means the rendering of a better service to our clientele.

I will name four important and possible sources of systemic disturbances through oral infection, as follows:

First—The pyogenic micro-organisms which are always present in an unhygienic mouth. In this we include carious teeth, abscessed teeth with sinuses opening into the mouth and constantly discharging pus, various stages of inflammatory conditions of the gums up to and including pyorrhea alveolaris. Under such conditions the normal process of mastication is greatly interfered with, but even if so the muscular action required, together with the contact of morsels of food, forces purulent matter from pyorrhea pockets and discharging abscesses, as well as various forms of micro-organisms from cavities in the teeth and from the interproximal spaces and around the necks of the teeth. Unfortunately, this conveys such bacteria into the stomach and many of these are not destroyed by the gastric secretions, but are carried into the intestines. We probably would be fully justified in placing enlarged and diseased tonsils under this head, since they are so closely identified with the oral cavity.

Second—The favorable condition for infection through open septic root canals. This source of infection is made possible by root canals being filled with septic matter, some of which may be forced through the apical end by the process of mastication. Some such roots may perforate the floor of the antrum and cause complications in this way and there are opportunities for other infections which may prove more or less serious.

Third—What are commonly known as "blind abscesses." These usually result from the death of the pulp in a tooth, which has never been treated or from imperfect dental service, where all the contents of the root canals have not been removed or the canals have been only partially filled, either of which may cause a "blind abscess," with a loss of tissue surrounding the root of the tooth and more or less systemic disturbances resulting therefrom.

Fourth—Impacted teeth. By impacted teeth, we mean those which do not occupy their normal relation and position in the mouth and are unable to fully erupt. This most frequently occurs with lower third molars where there is not sufficient room for them; and they often make their appearance at an angle which makes it impossible to fully erupt. The resultant pressure sets up an extensive inflammation which is responsible for a great deal of suffering and various forms of nervous affections. There is no question but that in many instances these aggravated impacted teeth are responsible for various forms of melancholia and even insanity. There are many cases on record in which relief from complicated and serious conditions have been secured through the removal of such impacted teeth. The X-ray is of distinct value in definitely diagnosing and locating the position of these impacted teeth, as well as in locating "blind abscesses."

Some of the systemic disturbances which may have their origin through such pathological oral conditions as have been enumerated are as follows: Neuralgic and nervous affections, antral, eye, ear, bronchial and pulmonary complications; gastric and intestinal disturbances; as well as mal-assimilation, mal-nutrition, auto-intoxication, arthritis, nephritis and other similar complications.

Of course we appreciate that there are many other factors which may be responsible for a very large per cent. of the conditions named, but there is no question but that the pathological oral conditions named have more or less of a direct influence in many of these. Since this is true, and it is all important to definitely establish a correct diagnosis, we, therefore, call attention to the possibility of this source of infection and would suggest that this should be one of the first sources to be eliminated, when diagnosing a case by a process of elimination. The reason for saying that this should be one of the first is the fact that pathological oral conditions can be very readily eliminated and, if neglected, may prove more or less embarrassing at some future time when it may develop that the origin of the trouble was through some oral infection which had never been suspected or even inquiry made relative to the condition of the mouth and teeth.

A paper on "Chronic Local Infection as a Causative Factor in Chronic Arthritis," by Dr. Frank Billings, of Chicago, was published in the *Journal of the American Medical Association* last month. In his "conclusions" Dr. Billings states: "The infectious source is usually local and located in the mouth (Alveoli), faucial tonsils or antra (sinuses)."

In presenting this subject in a way to secure best results, it would seem necessary to call specific attention to some cases which have come under my observation, and where there was seemingly no consideration given to oral conditions as a possible source of such trouble, and even in one case after attention had been directed to two teeth as a probable source of the trouble. (Case 5.) Such reference is made only to better impress upon the physician the advisability of recognizing oral lesions as a factor in many general systemic diseases, and with no thought of reflecting upon the medical profession, or lack of appreciation for the noble and self-sacrificing work which they are doing. I think most of you will agree that too little consideration has been given in the past to the relation of the mouth and teeth to health and disease and to a lesser degree the reverse can be said to be true. The fact that the offense, so to speak, is not as great with the dentist is unquestionably due to reduced opportunities and not to any particular immunity from making mistakes.

However, it is certainly gratifying to know that in the past few years there has been a disposition for a closer co-operation of our professions and it is interesting to know that more progress has been made in Ohio in the past year than has occurred in any previous five years, so far as I am informed. There should be no question that this relation will not only continue but it should increase from year to year with benefits to all, and it should be thoroughly understood that our patients are the ones, and rightfully so, to receive the greatest benefits. It is quite unfortunate that there is a disposition with the laity to look with distrust upon what either profession advocates, but time and service will certainly establish the fact with a vast majority that neither profession is as selfish as they have been accused of being, but on the contrary that they are constantly laboring to alleviate the suffering of humanity, and striving to educate the public to observe precautions which will assist in preventing many diseases that occur solely through ignorance and indifference. When many of the questions of hygiene and sanitation are better understood and more strictly observed, disease will be greatly reduced.

In order to better illustrate some of the points under consideration, I will briefly cite five cases as follows:

Case 1—Mrs. M., age 66, had suffered for thirty-five or forty years with a neuralgic condition of the face. Her suffering had been very severe for the last two or three years. All her upper teeth had supposedly been extracted for several years and she was wearing a full upper denture. She had been treated for various conditions and undergone two or three operations. The antrum had been opened and treated, but this nor any of the other sugical operations afforded relief. Finally, as a last resort and upon the advice of her physicians, she entered a hospital expecting to have the involved portion of her superior maxillary bone removed, but after examination the surgeon decided to have an X-ray made, which clearly showed an impacted upper right third molar. The writer was called in to extract the tooth, which was accomplished after a great deal of difficulty, as it was carious and the root badly exostosed and so deeply imbedded that it required considerable chiseling of bone before it was possible to get to the tooth. The patient made a rapid and complete recovery and wrote, some few months afterwards, that she had never been so free from pain in her life. She had been advised that it was absolutely necessary to perform this major operation and that she could have an artificial denture made so as to restore the contour of her face. This had been diagnosed as osteo-sarcoma, necrosis, etc., and it might be said that the removal of the jaw would evidently have cured either of these conditions, since it would have removed the tooth enmasse.

Case 2—A seven-year-old girl, poorly nourished and undersize. A physician had sent her to the Children's Hospital as suffering from blood poisoning resulting from an abscessed tooth and I was called to treat the case. She had a temperature of 103 and a badly swollen and discolored face, which made it difficult to make a careful examination. However, it was easily seen that there was more or less necrosis present and I extracted all the teeth, on the side involved, distal to the left temporary lateral and including the first permanent molar. These teeth were extremely loose and very easily extracted, which afforded some relief, but it was necessary for the antrum to be opened which was done through the nasal wall. This was irrigated for a few days until the child was somewhat improved and later the entire sequestrum was removed, with the first and second bicuspids and second molar embodied therein. Of course these three permanent teeth were not erupted and consisted of the crown portion only as the roots had not yet developed. The fact that this sequestrum extended from the first bicuspid to and including the second molar gives an idea of the extent of the necrosed area. With but little necessary after-treament the tissues readily adjusted themselves and with scarcely any disfigurement. I do not consider that an abscessed tooth was responsible for this necrosis, neither could I secure any specific history. It was reported that the child had the measles twice during the past year which left her with some ear complications and this, together with her unsanitary environment and undernourished condition, was probably responsible for the antral infection, which no doubt was the origin of the necrosis. This case is reported to show the relation of systemic or other conditions to oral diseases.

Case 3—Mrs. D., wife of a physician. All her teeth had supposedly been extracted for ten years and she was wearing upper and lower dentures. She was highly nervous, so much so that she hesitatingly submitted to a careful examination in locating the cause of her trouble. Her husband explained that she had been suffering for years with neuralgia and finally a condition of the mouth had developed which they thought had more or less to do with her trouble, but explained that they had been unable to get any definite diagnosis of the case and had suspected necrosis, sarcoma, etc. I found a highly inflammatory condition slightly anterior to the normal position of the floor of the antrum and finally found a minute opening. Tracing this with a probe a small portion of the root of a tooth was located and removed. This piece of root was only slightly in excess of a quarter of an inch in length and very small in diameter, which goes to show how some extremely small portion of a tooth can cause trouble. The lady was so highly elated in having this root removed, and to know that there was nothing of a more serious nature present, that she said she would not have the root back for $1,000. Her husband wrote some months later that the neuralgic condition was relieved immediately following the removal of the root.

Case 4—Prof. S., age 40, high school teacher, was under treatment for more than a year by altogether six general practitioners and specialists of prominence. This case was diagnosed as conjunctivitis, iritis, cyclitis and other inflammatory conditions of the right eye, which later involved the left one, accompanied by glandular enlargement of the neck and thorax and general debility with a loss of twenty-five pounds in weight. After some months of treatment, without result, he consulted an internist who found the blood pressure low, the hemogloblin low and the general condition about 20 per cent. below par and informed the patient that the glandular involvement and other symptoms reminded him in some ways of Hodgkin's disease. The patient consulted the writer for examination of his teeth and all were found to be in good condition with the exception of the right upper third molar, which I wanted to extract five or six years previous. The tooth was extracted, the dark glasses were soon discarded, the glandular enlargement promptly subsided and the general condition rapidly improved, until the lost weight of twenty-five pounds was fully regained within a few weeks. The only medical attention received, following the extraction, was that the eyes were examined and ordinary glasses fitted.

Case 5—Miss B., age about 22, was brought to the office by a specialist, accompanied by her father. The patient had first been treated by a cancer specialist with plasters, etc. She had finally undergone two or three operations which had removed considerable of her chin and had received some forty-five X-ray treatments. There was a constant discharge of pus at the symphysis of the lower jaw and they brought an X-ray plate to show the relation of two lower incisors, with putrescent pulps, which clearly showed a direct connection with the external openings. I refused to extract the teeth and insert a bridge, as requested, until after an effort had been made to treat them as I thought their condition was responsible for the supposed cancer. They did not want to delay operating again and it was explained that it would require only a short time to determine whether or not these teeth were responsible for the trouble and that there would be ample time for a further operation after it was shown that there was no hope of relief in this manner. The father stated that a prominent surgeon had operated the case two or three times and that before anything was done relative to the teeth that they would first consult him, to which I readily consented, but requested that they call his attention to the conservative treatment which I suggested. They did not return and some time later I ascertained that the case had been treated by another dentist and the trouble entirely corrected in this manner. The dentist of the surgeon in question treated the case and I naturally supposed that this had been referred to him to confirm my diagnosis, but imagine my surprise when the patient later explained to me that the same surgeon again operated immediately following my diagnosis and without any more benefit than had been obtained through previous operations. It was following this operation that he referred the case to his dentist, and I have the statement of the dentist, who is now deceased, and the patient, that the case yielded so readily to the treatment of the teeth that they were all very much surprised. The patient explained that it was again necessary to have another operation, but this last was a plastic one and done with the hope of correcting, in so far as possible, the disfigurement resulting from the previous operations.

A STOCK VACCINE FOR PYORRHEA

BY GEORGE B. HARRIS, D.D.S., Sc.M., DETROIT, MICH.

FROM THE RESEARCH LABORATORIES OF PARKE, DAVIS AND CO.

BACTERIAL VACCINES ARE BASED on the principles of phagocytosis. They are able to increase the phagocytic power of the leucocytes. Phagocytosis is Nature's method of combating infectious diseases, and any means employed to increase phagocytosis is simply assisting Nature to overcome an infection by natural means. The process of phagocytosis plays no part in the building up of the destroyed tissue however, therefore, we cannot expect a vaccine to do it. Tissue resistance is dependent upon this process, and where the resistance or the phagocytic power of the leucocytes is low, permitting an infective condition to come about, this resistance can be again restored by the use of vaccines, bringing about the destruction of the invading organisms, thus giving Nature a chance to make a repair.

I would not care to say that all cases of pyorrhea are infective, but I am inclined to believe they are. That does not necessarily mean that pus is present in all cases, for it is not. The infection in such cases is a non-pus-producing organism—in most cases the streptococcus. An infection such as this is much more serious to the general health of the patient and gains ground much more rapidly than does an infection of a less virulent organism such as the staphylococcus albus. The lesson is this:

1. That the amount of the pus has little bearing on the seriousness of the case or the chances for a complete recovery.

2. That the presence or non-presence of pus is not a diagnostic means of determining whether a vaccine is indicated or not.

Notice, please, that I said "chances for a complete recovery." Vaccines nor any other treatment will not cure *every* case of pyorrhea. If we were able to do that we would be equally able to cure every disease that is curable at times. If this were possible, what a grand old world this would be. Every known curative agent fails us sometimes and sometimes in cases we least expect it, but that is no reason why we should not employ vaccines on pyorrhea. But this paper is to cover research work along the lines of a stock vaccine, so let's get back to the subject.

Autogenous vaccines are preferable to stock vaccine under certain conditions, but they have some serious drawbacks:

1. Some pus must be collected and sent to a laboratory. This is followed by a wait of a week before the vaccine arrives. There is danger of leaving out one of the most important cultures in the collection of the pus, or it may die in transit, if the distance is great, or it may be left out of the vaccine in the laboratory. Any of these conditions would make the vaccine useless.
2. The expense of the vaccine.
3. A stock vaccine can be kept continually on hand and the treatment started at once instead of having to wait a week or longer for the arrival of an autogenous.
4. The clinical record of this vaccine, I believe, warrants its use in preference to an autogenous vaccine in the large majority of cases of pyorrhea.

In order to produce a stock vaccine the organisms from a large number of cases had to be isolated to determine the prevalent organism. This appeared to be a big task, for it was necessary to persaude men throughout the city to collect the pus for me, which is not as easy as it might be. Again, the time consumed in chasing after cultures is great. You may spend two hours securing one tube and then find it is no good, due to the fact that the dentists generally are not accustomed to collecting the pus and do not know where to take it from. However, it proved easy, thanks to Dr. Oakman, who supplied me with a great many cultures and made possible an early completion of the work. After all it's "the man behind the gun" who fires the shot. He's the man who made this vaccine available at this time and its users owe him a debt of gratitude. I wish to thank him for the great assistance he has rendered me.

Three organisms were found to be constant:

1. Streptococcus Pyogenes.
2. Staphylococcus Pyogenes Albus.
3. Pneumococcus.

They are arranged in the order of their importance. The first thing you will notice is the absence of the Staphylococcus Pyogenes Aureus. It is not in the vaccine:

1. Because experiments show that the vaccine without it is as efficient as with it. (Apologies to my friend, Dr. Laymon, who believes the Staphylococcus Aureus to be the pyorrhea-producing organism.)
2. Because the Albus is capable of immunizing against the Aureus.
3. Because I did not want a shotgun vaccine if it could be avoided without affecting the efficiency of the vaccine. Its absence does not and therefore, it is omitted.

Cultures raised continually on artificial media are supposed to lose their efficiency when made up into a vaccine. That is a supposition, but should that be so, to avoid any detrimental effect it might have on the efficiency of the vaccine, new cultures from pyorrheal cases are to be constantly added. This vaccine is now being prepared for the dental profession by Parke, Davis & Co., and if it is not on the market before the publication of this article it will be very soon after.

In conclusion I wish to thank Dr. Houghton and Dr. King for opening the research laboratories of Parke, Davis & Co. to the dental profession, for the assistance they have rendered me while conducting research work in their laboratories.

SPLINTING IN PYORRHEA ALVEOLARIS *

BY DR. CLIFFORD GUY HUGHES, PITTSBURG, PA.

BY REQUEST, I WILL GIVE BRIEFLY the system I use in caring for a mouth afflicted with what is commonly termed pyorrhea alveolaris and my method of splinting loose teeth caused by this disease.

First—I get the history of the case and patient, then make a thorough examination of the teeth involved; then I get in front of my patients and try to explain the condition they are in and the effect such a condition as exists in their mouth has on their stomach and general health, telling them of the poisonous fluid and pus they swallow and take into the stomach. Now, this is very necessary in order to educate the patients so they can fully realize in a way what getting rid of that condition would be worth to them.

Few of us know how to charge for time and service. Some say, "Well, I cannot take the time to treat the case thoroughly and often; for such a length of time, I cannot charge enough."

Now, take one-half hour for your talk to patients and explain all this operation, the benefit they will derive, and try to educate them and make them realize the worth of a cure, as they do the misery and discomforts of the present condition of the mouth, teeth, and health. Show them where they are to be benefited, and they will realize and feel that they are to derive so much more from your service than they ever thought of before, and tell them your time is worth on such work $5.00 or $10.00 per hour or more for such service. So many are afraid to charge for time and service as they should; the standard is too low. We all underestimate our worth for services rendered, and a few that realize this and give good service and get good fees, have not the power and influence to raise the standard of the little fellow who is afraid to ask a fee for fear his patient will go to some one else. If you can deliver the goods, you can get your fee.

TREATING

First take a pellet of cotton in pliers and use pure peroxide or dioxygen, force around the neck of the teeth and under margin of gum, then rinse with tepid water with some good mouth wash. I use lavoris. I use plenty of water and lavoris, using a quick-filling syringe, as I like to keep the mouth rinsed as clean as is possible while operating; then I use cotton and dentinol as I use peroxide; then rinse. Then start to scale the teeth and roots of every affected tooth. I use several shapes and kinds of scalers, and for the root and deep work, I find several of Dr. Taggart's instruments very convenient for this work. Great care should be exercised in this operation: *First,* to cause as little pain as possible; *second,* to do every root and tooth as thoroughly as you can, as you cannot get results unless you take plenty of time and be very particular to get all the accumulation off the roots. If the case is really bad and very sore, you can use analgesia and will be heartily thanked by your patient when finished.

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*Read before the West Virginia State Dental Society, 1913.

After getting the teeth well cleaned and scraped, I take my Sub. Q. treating syringe and fill with peroxide or dioxygen and inject around and down into the pus pockets of all these teeth. This assists in removing debris from down around the roots and under the gums; then again I use water freely; then I fill syringe with Dentinol and inject this as I did the former down in the pockets and try and get it to come in contact with all affected parts of the tissue. This is severe and painful and hot, especially on the lips; then rinse again thoroughly and in about a week repeat this treatment and you will find it not nearly so severe. After the gums show improvement, put the patients on pyorrhocide, have them get a good hard tooth brush and a can of this powder and use every night before retiring. The more the stiff bristles cut and bleed the gums, the better, as they will in two weeks get healthy and tough and begin to tighten nicely around the teeth. Some of my cases I treat regularly for seven or eight months, then every three or four months and so on as I feel it necessary to keep the mouth right and from starting back. You must keep your patient interested and after the teeth all the time until it becomes a habit.

In these bad cases, we find the mouth harbors at least 250 different forms of bacteria and the system is always hyper-acid. I often advise the use of grape fruit or limes in the mornings and have some patients get French Celestian Vichy and drink for one week; then omit for a week and then again, etc. This I find has apparently helped the system very much to recuperate and assist in curing this condition. The massaging of the gums is always beneficial.

Sometimes we find some of these teeth so loose we can hardly handle them. When so, I usually splint them and at times find I have to splint both jaws complete. The splint I have on this typodont will show how the work goes in the mouth and how the teeth are prepared. I first groove the lingual surfaces; then drill a pin hole between the enamel and dentin distally and fit iridio-platinum threaded wire into pin holes; then heat inlay wax form and press over pins and distal surface of teeth and trim so as to make possible the removal when hard. I always grease the surface before applying pins and wax to assure easy removal of wax. Often I make four teeth to the casting, but often when crooked, can make but two. In preparing crooked teeth, you have to drill pin hole at angle in the crooked tooth so as to lift out with the other pins.

There are so many little things in connection with this work that one does not think of to mention in a paper. I would be pleased to answer any questions put to me regarding this line of work or treating. As for splinting teeth, no matter how loose, as long as the end of the root can be put in condition by treating so it will stand pressure direct, as biting, etc., without pain, you can feel safe in connecting it up solid with splints.

DISCUSSION

Dr. H. H. Smallridge, Charleston, W. Va.: The paper has been very interesting to me. Dr. Hughes said that the conditions of the mouths very often are such that he hesitates to get close to them. That is the way I feel about it. I am only sorry that we are not so situated in West Virginia that we could turn them over to a man in our home town to give them proper treatment.

I have been trying to treat pyorrhea for a number of years and the results are probably as good as I can get. I have found that the best results have been in the cases where the patients have helped in the treatment.

Dr. Wm. O. Hulick, Cincinnati, Ohio: I do not care to enter into a general discussion of this particular paper because of my inexperience in handling pyorrhea cases.

What is pyorrhea? What is the cause for these conditions? I have long since given up my pyorrhea cases to men who have made careful study of that work. We have men in our city who take care of all those cases, and for that reason I have not made a careful study of pyorrhea cases. I think, after all, the matter is one that requires great study and great care in knowing what to do and when to do it. Generally speaking, gentlemen, pyorrheal conditions are caused from unsanitary mouths, and it is not noticed by the individual unless special attention is drawn to it by the operator, and we are often neglectful in calling attention to these matters.

I should like to have defined to us a little more particularly what pyorrhea is. Dr. Fletcher, of Cincinnati, has made a very careful study of this subject. He has examined the records in Smithsonian Institute and says there is no such word as pyorrhea in the dictionary. He calls it, as you all know, alveolitis. So a man of that kind, to my mind, is the one to discuss a paper like this.

Dr. J. H. M'Clure, Wheeling, W. Va.: I have seen some splints that worked and some that did not, and have come to the conclusion that when a tooth is so loose you had better take it out and not injure the one next to it.

Dr. E. S. Bullard, Wheeling, W. Va.: I have had several experiences in pyorrhea cases myself.

Dr. Hughes brought out the point that he used peroxide. I do not think there ever was a condition in the mouth that would require peroxide. I think the best thing you can use in pyorrhea cases is pure water with the proper instrumentation.

As far as extracting teeth is concerned, I think it is a very bad practice. The fact of the matter is that in the last eleven years I have a record of pyorrhea cases I have treated and, out of 130 cases, I have lost only 11 per cent. of the teeth that I have treated in that time.

Dr. Hughes: In regard to this question as to what pyorrhea is, I am like every one else. I am a little backward about telling what it is, and I do not think at the present time that any one is competent to answer it.

I merely use peroxide to loosen up anything that may be on the teeth. It brings it out because it has that power of expansion. Some say that they do not approve of its medicinal property, but I think if you use dentinol you will get great benefits from it. I have gotten results and can prove my results, and I feel perfectly safe in getting up and telling about them.

I want to thank you all for your very courteous attention, and I hope that some of the people who have not had as much experience as myself will profit by this paper and that it will give them a start.

In regard to the models I passed around I wish to say that the one is made of a removable bridge and the inlays are not extended up as in a practical case. Of course, a great many will see that and criticise it, and in practical work it would not be policy to make it in the way the model is made.

A REVIEW OF A FEW POINTS OF PRACTICAL IMPORTANCE IN THE HISTOLOGICAL STRUCTURE OF DENTIN AND ENAMEL*

BY W. C. STILLSON, D.D.S., CLEVELAND, OHIO

DR. FREDERICK B. NOYES, in his recent textbook on Dental Histology and Embryology, makes the following statement: "The development in knowledge of the cell has had a most profound effect upon the entire practice of medicine—in fact, the progress of modern medicine has dated from the studies of cell biology, the germ theory of disease being only one of the phases of this development."

So, also, it may be said that the advancement made in recent years in the development of our knowledge of cell activity has had a most profound effect upon the entire practice of dentistry. It may be said that the progress of modern dentistry has dated from the establishment of certain definite and well-defined microscopical facts. The importance, therefore, of a knowledge of the fundamental principles of biology, embryology and histology as related to the dental tissues cannot be overestimated and it might be well to pause here for a brief survey of these fundamentals before an effort is made to review the structure of dentin and enamel.

CELL ACTIVITY

The cell is not only the histological unit of structure but the rational basis upon which the analysis of all physiological functions and pathological conditions depends. Normal physiological action simply means normal cell activity, while pathological conditions are the result of morbid or abnormal cell activity. In the complicated processes of waste and repair, secretion and excretion, the cells of the body are constantly undergoing metabolic changes. The formation or building up of complex subsubstances within the cell has been called Anabolism. If the process is destructive or the conversion of complex to simple substances, the phenomenon has been termed Katabolism. A secretion, an excretion or an intercellular substance may be the result of an anabolic change. This constant cell activity together with cell reproduction, which is but one phase of cell activity, ultimately results in an entire change in the tissues and organs of the body.

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*Read before the Cleveland Dental Society, November, 1913.

HOMOLOGIES

The teeth are homologous to the hair and nails and must be considered appendages of the skin and part of the exo-skeleton. The hair shafts, the nail plates and the enamel of the teeth are of epithelial origin and derived from the ectoderm. The hair papillæ, the nail beds and the dental papillæ are of connective tissue origin and derived from the mesoderm.

DEVELOPMENT OF DENTIN

A good understanding of the histological structure of the tissues of the teeth can be had only by a careful study histogenetically. In the development of the tooth germ and later in the calcification of the dentin, enamel and cementum, metabolism plays the all-important part. This is particularly interesting in the process of calcification, for here the cytoplasm of the formative cells becomes a sort of chemical laboratory, as it were, absorbing the inorganic salts from the lymph and plasma about them and depositing them in the form of calcospherites in the case of dentin, in the form of calcific globules in the case of enamel and in the form of a matrix, greatly resembling the matrix of bone, in the case of cementum.

Dentin is formed from the dento-enamel junction inward. The odontoblasts or tall columnar cells upon the periphery of the dental papilla are responsible for its formation. These formative cells are not destroyed when dentin formation is complete but persist throughout the entire life of the pulp. As the odontoblasts recede they leave small tubules in the dentin matrix which contain what are known as the dentinal fibrils. These dentinal fibrils are protoplasmic processes of the odontoblasts. It is an interesting and important fact that although dentin as a tissue contains living processes, it possesses no power of repair. When once it is destroyed or decalcified it can never be replaced by dentin. Other tissues of the body, when injured or impaired, may, through the process of metabolism, again resume the normal, but in the case of dentin no additions can be made except within the pulp chamber, where secondary dentin may be added by renewed activity of the odontoblasts. In former years a great deal was said about the recalcification of dentin. Some claimed that certain filling materials could be inserted over some softened dentin and that these filling materials would effect a change in the tissue in the nature of recalcification. In the light of our present knowledge of biology we know this to be an error and realize that the only secure method of treating caries of dentin is by absolute removal of all carious areas.

FUNCTION OF DENTINAL FIBRILS

Dr. Black states that the dentinal fibrils are composed of the same material as the nuclei of the odontoblasts and that they have two functions: *First,* a sensory, and *second,* a physiologic.

The presence of nerve fibres in the dentinal tubules has never been demonstrated and it is erroneous to state that the sensitiveness of dentin is due to the irritation of the nerve fibres there present. The final nerve endings of the pulp are found between the odontoblasts, and sensitiveness of the dentin is due to the fact that the tubules contain protoplasmic processes which have a direct connection with the odontoblasts, which, in turn, lie in protoplasmic relation to the nerve endings.

The physiologic function of the dentinal fibrils seems to be the maintenance of the quality and integrity of the dentin. Clinical experience has taught us that the dentin of pulpless teeth undergoes marked changes. It becomes more brittle and loses much of its strength, elasticity and translucency and the removal of enamel becomes much more simple. These same changes at times occur in vital teeth, where there has been marked abrasion. In these cases the deposit of secondary dentin probably obliterates the connection of the fibrils with their odontoblasts and the wearing away of the incisal or occlusal surfaces exposes the dentin and permits these changes to occur rapidly because of the invasion of saliva or extraneous material. This change or deterioration in dentin, after pulp removal, occurs much less rapidly in teeth that have been so treated and filled that no septic matter, saliva or decomposable material has reached the dentin.

Thus we see that these dentinal fibrils do exercise a physiologic function in the maintenance of the quality of the dentin. How this is actually accomplished we do not know but we do know that a destruction of the vitality of the dentinal fibrils produces marked physical changes in the tissue.

SIZE AND DIRECTION OF THE DENTINAL TUBULES

A wide and fertile field for original research is open in the size of the dentinal tubules. We have little definite data as to their size in different locations in the dentin or at different ages or under different pathological conditions. We may say roughly that they vary from one to three microns in diameter. It is probable that they become smaller as age advances, due to an additional deposit of calcium salts upon their inner circumference. A difference in their size in different teeth may account for hypersensitiveness or lack of sensitiveness, but this cannot be stated absolutely.

In studying the course of the tubules we find a surprising regularity of their direction in different portions of the dentin and in the teeth of different individuals. In the crown portion they describe sweeping curves more or less S-shaped in outline from the pulp chamber to the dento-enamel junction. These sweeping curves have been called by

Charles Tomes the primary curves. In the root portion of the dentin they seem to exhibit no primary curves but run almost directly from the pulp chamber to the dento-cemental junction.

Upon more careful examination of the dentinal tubules, we find they are wavy and give the appearance of being spiral in their course. These waves, or secondary curves, we find are surprisingly regular as we follow the course of a tubule from the pulp chamber to its outer extremity.

It has been stated that the difficulty experienced in obtunding or in forcing anesthetizing solutions through the dentin of some teeth was due to the presence of "curly dentin," the inference probably being that the tubules in some teeth are far more irregular than in others either in their primary or secondary curves or in their anastomosis. I believe that cases of this kind are indeed rare for the microscopical examination of a great many specimens will show that the direction and course of the tubules and their anastomosis does not vary to any perceptible degree in the primary dentin of different teeth. This difficulty experienced in obtunding some teeth is undoubtedly due to the presence of secondary dentin. The fact that secondary dentin contains less regularly-arranged tubules and is of less-perfect structure easily explains this difficulty. Again, it might possibly be explained by the difference in the size of the tubules of different teeth.

ANASTOMOSIS OF THE DENTINAL TUBULES

The anastomosis of the dentinal tubules in the crown portion is not profuse except in the outer part of the dentin next to the enamel. Here the branching is very marked and has been described as resembling the figure Y or the delta of a river. This profuse branching of the tubules at the dento-enamel junction undoubtedly accounts for the extreme sensitiveness of the dentin at that point; a greater surface of dentinal fibrils being exposed to the mechanical or thermal irritation of the excavator. Recognizing these facts it is not difficult to see the occasional necessity for the use of obtundents or for pulp removal in the preparation of teeth for telescope crowns. The marked branching in this location also facilitates the rapid spreading of caries along the dento-enamel junction.

GRANULAR LAYER OF TOMES

In the root portion of the dentin the anastomosis of the tubules is extremely profuse throughout their entire extent. The granular layer of Tomes lies at the dento-cemental junction and is filled with the protoplasmic enlargements of the ends of the fibrils. When we realize that this granular layer extends the entire length of the root from the gingival line to the apex, we can easily account for the extreme sensitiveness of cavities or eroded areas at the cervix; an irritation at that point would mean an irritation to the fibrils of the entire root. Often in the removal of calcareous deposits or necrosed cementum from the roots of teeth this same condition of sensitiveness is encountered, due to an exposure of the dentin and irritation through this granular layer. In this particular condition the use of a two per cent. solution of silver nitrate has been suggested by Dr. Stephan. A solution of this strength is especially indicated here because of its non-irritating effect upon the soft tissues.

SECONDARY DENTIN

The line of demarcation between primary and secondary dentin is by no means distinct, nor is it easy to define primary and secondary dentin. The dentin formed during the period of tooth development may be called primary and that formed later, due to some outside stimulation, secondary dentin. We may say that each successive formation of secondary dentin becomes less perfect, the tubules smaller, less numerous, and more irregular until finally a calcified matrix containing no tubules is deposited. In the formation of primary dentin apparently all of the odontoblasts participate; with each successive formation of secondary dentin less and less of these formative cells take part. Gradually the communication between the pulp and dentin matrix is reduced and finally almost obliterated.

We have said that secondary dentin was apparently formed in response to some outside condition. Dr. Noyes states "that these conditions may arise in the tooth in which the formation occurs, or the irritation of one tooth may cause tissue formation in all or parts of the others. It has not been determined whether such reflex trophic stimuli are confined to the same lateral half or to the same nerve distribution." Here, also, is an excellent field for research.

In addition to the practical points already mentioned regarding the deposit of secondary dentin, it should be borne in mind that this secondary tissue is at times of vital importance in pulp preservation. In cases of abrasion, erosion or caries, secondary dentin is the expression of nature's effort *to maintain the vitality of the pulp.* When metallic fillings have been placed very close to the pulp, patients sometimes later complain of extreme pain following thermal change. Dr. Black refers to this as thermal sensitiveness. In these cases the patient should be advised to avoid as much as possible subjecting the tooth to thermal change for a time to permit the deposit of secondary dentin. A failure to do this may result in hyperemia and almost immediate death of the pulp.

STRENGTH AND ELASTICITY OF DENTIN

In all operative work it should be remembered that the dentin gives to the tooth its strength and every effort should be made toward its conservation. In the preparation of roots for the dowel crown the canal should be reamed only large enough to receive a dowel of sufficient strength, leaving all the sound dentin possible. The following method of root preparation for the cast base porcelain crown has been suggested by Dr. Price. The root is prepared and the canal reamed the desired size. Then with a small stone or inverted cone bur a crescent-shaped groove is cut parallel with the circumference in the lingual half of the face of the root. A casting made to fit the end of a root prepared in this way relieves the dowel of considerable strain and prevents fracture of the root—a unique and simple method of obtaining the desired result. In large mesio-disto-occlusal cavities in molars, and especially in bicuspids, every effort should be made to leave a strong wall of sound dentin extending from the buccal to the lingual cusp. When this is not possible it is imperative that a portion of the buccal and lingual cusps be trimmed down and the filling built out upon these walls in such a way as to be an absolute protection. In cases where there is apparently no support of dentin it is best to resort to the use of a crown, for the enamel, in itself, is inelastic and brittle and would not be able to withstand the stress to which it would be subjected.

The fracture of roots carrying porcelain crowns and the fracture of either the buccal or lingual wall of a bicuspid or molar which has contained a mesio-disto-occlusal filling are probably the most frequent disasters resulting from the removal of too much dentin. I will consider the dentin as a support to the enamel wall in the preparation of cavities later.

While dentin exhibits, to a marked degree, the property of elasticity, it is not as elastic as bone, since it contains 4 per cent. more of inorganic matter than dry compact bone. This particular quality of elasticity of dentin gives to the enamel its firm support and permits of the formation of parallel cavity walls in the tissue preparatory to the insertion of the gold filling, for the wedging of the gold into the cavity compresses the dentin walls and gives to the filling all the retention necessary.

DENTO-ENAMEL JUNCTION

The dento-enamel junction in its irregularity is not unlike the junction of the false and true skin or the union of the epithelium and tunica propria of mucous membranes. Since the enamel is of epithelial origin and the dentin of connective-tissue origin this fact is little other than would be expected. The dentin is formed first and thrown down or calcified along this irregular line; enamel calcification follows rapidly, the inner ends of the rods being built into this already formed dentin. The extent of the irregularity of the dento-enamel junction varies in different teeth. The interlocking is like that of the sutures of the skull and is simply the method designed by nature to facilitate a firmer grasping and a stronger hold upon each other. The degree of this irregularity, therefore, plays an important part in the cleavage of enamel (if resting upon sound dentin), either in the preparation of cavities or the removal of this tissue preparatory to the construction of a banded crown. The greater the irregularity or interlocking, the more difficult will be the cleavage.

DEVELOPMENT OF ENAMEL

The formation of enamel slightly follows the formation of dentin. The ameloblasts or tall columnar cells which make up the inner tunic layer of the enamel organ are responsible for its formation. Through the process of anabolism the cytoplasm of the formative cells absorbs from its environment the inorganic salts necessary to enamel formation, elaborates and alters them and deposits them in the form of calcific globules one upon the other, each cell being responsible for the formation of an enamel rod together with some interprismatic cement. As enamel formation proceeds, the ameloblasts recede, passing from within outward, the enamel being deposited in the trail of these formative cells. The ameloblasts themselves do not calcify, they are the active agents of calcification. The formation of enamel is completed before the tooth erupts, the ameloblasts or formative cells being destroyed. Prof. R. R. Andrews, however, in his articles on calcification, seems to advance the theory that the so-called Nasmyths membrane is formed by a merging together of the cells of the stratum inter-medium of the enamel organ with the last layer of ameloblasts, an imperfect hornification being formed. Whether or not the ameloblasts enter into the formation of Nasmyths membrane or are destroyed before tooth eruption, is, after all, a matter of little importance biologically, for we know that Nasmyths membrane is so thin that it soon is obliterated by wear and the fact remains that the formative cells of enamel are absolutely destroyed. From these studies in enamel we must conclude that this tissue differs from all other calcified tissues of the body and that a vital change in its histological structure after tooth eruption is a biological impossibility. This point is brought out here simply to show the error of a few men who, even today, make occasional reference to the "absorption of the enamel" or "the softening of the teeth during pregnancy" or to the "soft teeth of childhood" proclaiming that the teeth of a child should not receive a permanent filling at once, but that a temporary filling should be inserted awaiting the "hardening" of a few years before the permanent filling is made. It is not difficult to realize that these men have given the subject of tooth formation very little consideration.

HARD AND SOFT TEETH

Almost two decades have elapsed since Dr. Black gave to the profession the results of his "Investigation of the Physical Character of the Human Teeth." The storm of disapproval which followed the presentation of this work has gradually subsided and today it is generally accepted. For the purpose of review it might be well to recount a few of his more important discoveries along this line.

1. There is no basis for the supposition that the teeth of children under the age of twelve years are too soft to receive metallic fillings.

2. Differences in the strength of teeth have no influence as to their liability to caries. Differences in density or in the percentage of lime salts in the teeth have no influence as to their liability to caries.

3. Caries of the teeth is not dependent upon any condition of the tissues of the teeth but on conditions of their environment.

4. Imperfections of the teeth such as pits, fissures, rough and uneven surfaces and bad forms of interproximate contact are causes of caries only in the sense of giving opportunity for the action of the causes that induce caries.

5. There is no basis for the supposition that some teeth are too soft or too poorly calcified to bear filling with gold or other metal in use for that purpose since all are found to be abundantly strong.

6. There is no basis for the treatment of pregnant women medicinally with the view of furnishing lime salts to prevent the softening of their teeth or with the view of producing better calcified teeth in their offspring.

The statement that this work has been generally accepted by the profession is not made without the full realization of the fact that there are still a few who are in doubt regarding them. Among the foremost of these is probably Dr. Joseph Head, of Philadelphia, whose work in so-called "hardening and softening of enamel" has recently appeared. The following quotation from the late text-book of Dr. Black seems to strike the keynote in the discussion of this subject. "It is perhaps well for the human family that opinions so widely held should have great weight in all matters pertaining to human welfare. They should not be cast aside without the very best reasons for so doing."

DIFFERENCE BETWEEN ENAMEL RODS AND CEMENTING SUBSTANCE

As early as 1896, Dr. Charles Tomes, after exhaustive experimentation, was led to the conclusion that enamel contained not more than a trace of organic matter. After Dr. Leon Williams had attacked the problem from the microscopic and microchemical side he was forced to the conclusion that normal enamel contained no organic matter. Accepting, then, the fact that enamel is composed entirely of inorganic salts, we must not fail to recognize the marked difference in the physical and chemical properties of the enamel rods and cementing substance. We may determine these differences in three ways: *First,* mechanically; *second,* chemically; *third,* microscopically.

In the cleavage of enamel it is found that the line of cleavage always follows the general direction of the enamel rods. Of course an occasional rod may be broken but the general direction is along the line of the rods or between them. This shows conclusively that the cementing substance is not as strong as the rods and this one fact alone forms the basis for the use of hand instruments in cavity preparation and especially in our work upon enamel, thereby adding greatly to the rapidity and accuracy of the operation.

It is also a very simple matter to show the difference between the rods and cementing substance chemically. If a thin longitudinal section of enamel be subjected to a weak solution of hydrochloric acid and the action watched microscopically it will be noted that the cementing substance is rapidly dissolved out from between the rods. It seems that the more dilute the acid the greater will be the amount of cementing substance dissolved out before the rods are attacked. Recognizing this fact, it is indeed important that extreme care be exercised in the use of all mineral acids about the enamel. In placing these acids in the pulp chamber in the treatment of teeth, great care should be taken to prevent their escape upon the enamel. Inlays should never be taken from the pickling solution to the cavity without thorough neutralization of the acid used in pickling. Who shall say that carelessness in this particular will not account for many poor margins about some of our inlays, the weak acid solution having dissolved out the cementing substance, the rods at the margin are soon washed out?

In this connection I will say that it is my belief that all those preparations advertised to remove stains and calcific deposits from the teeth without injury to the enamel should be used with some degree of hesitancy.

The greater refracting index of the cementing substances seems to account for the microscopic difference between the structural elements of enamel, but this fact has little practical value except in the study of enamel in the laboratory.

STRAIGHT AND GNARLED ENAMEL

Straight and regular enamel is to be found upon the axial surfaces or those parallel with the long axes of the teeth. It is difficult to follow the course of an enamel rod its entire extent, but the rods undoubtedly extend from the dento-enamel junction to the outer surface. Over the points of the cusps and marginal ridges and upon the occlusal surfaces of the molars and bicuspids is found what rightly may be called gnarled enamel. Here the rods are very irregular in their course and seem to be wound and twisted about each other. This is particularly true of that half of the enamel next to the dento-enamel junction in these special areas. It is evident that enamel so formed will resist the chisel considerably more than straight enamel and this difference in the cleavage of straight and gnarled enamel has been a large factor in leading operators to believe that there is a difference in the physical character of the teeth.

DIRECTION OF THE ENAMEL RODS

Aside from extension for prevention perhaps nothing has contributed so largely toward placing cavity preparation upon a truly scientific basis as the realization of the importance of the direction of the enamel rods. We have come to know that in the preparation of cavities the direction of the enamel rods must be constantly borne in mind if the work is to be done correctly. Dr. Noyes has described the direction of the enamel rods so perfectly that I will quote from him directly: "In a bucco-lingual section through a bicuspid, beginning at the gingival line, the enamel is normally overlapped by cementum, and in the gingival third the rods are inclined more or less apically from the horizontal plane. The degree of inclination varies considerably. It may be as much as 12 degrees centigrade, but it is usually not more than six. In general, the more convex the surface the greater will be the inclination. At some point between the gingival and middle thirds and the middle of the middle third of the surface they are in the horizontal plane and at right angles to the axis of the tooth and at this point they are usually very nearly perpendicular to the surface. Passing occlusally from this point, they incline more and more occlusally until in the occlusal third they reach an inclination of 18 to 20 degrees centigrade occlusally from the horizontal. The rods which form the tip of the buccal cusp do not reach the tip of the dentin, but the buccal slope of the dentin. Over the tip of the dentin cusp the rods are in the axial plane, but in this position they are usually very much twisted. Passing down the lingual slope, they become more and more inclined lingually from the mesio-distal axial plane, and the degree of inclination is related to the height of the cusp—the taller the cusp the greater the inclination. At the developmental groove or pit they meet the rods of the lingual cusp which are inclined in the opposite direction. In a mesio-distal section the plan of arrangement will be seen to be the same, the tip of the marginal ridge corresponding to the tip of the cusp. In an incisor the arrangement is similar, the lingual marginal ridge corresponding to the rudimentary cusp."

CLEAVING AND PLANING OF ENAMEL

It is quite evident that in all our work with enamel but two things are to be accomplished: *First,* the cleavage, and *second,* the planing. In the preparation of cavities undermined enamel is much more easily cleaved than that supported by sound dentin and yet it is possible to cleave enamel resting upon sound dentin with the proper keenness of the blade of the chisel and the correct application of force. When enamel resting upon sound dentin is to be removed it is better to first cut out the support of dentin with a bur, after which the enamel is easily cleaved. More difficulty is always encountered in the cleavage of gnarled enamel than straight. The tissue will split through to the gnarled portion and then break in an irregular way which makes the removal of the dentin most imperative if results are to be obtained. The error is often made of attempting to remove too much enamel at a time. The blade of the chisel should be placed only a short distance from the opening of the cavity and piece by piece the enamel may be removed. Some use the mallet with the chisel, which is a very efficient method, and still others simply use hand force. In the removal of enamel in preparing teeth for crowns the mistake is very often made of hoeing or scraping, but the same principle here should be applied of cleaving only a small piece at a time, the keenness of the blade of the cleaver being a very important consideration.

By planing enamel we mean simply the removal of the roughened surface left after cleaving. The broken or fractured rods are removed, the wall made smooth and given the proper direction. This is accomplished by using the blade of the chisel as a plane. There is, it is believed, no method quite as efficient as the one just outlined for the correct and rapid preparation of the enamel wall.

REQUIREMENTS OF THE ENAMEL WALL

The first requirement of a strong enamel wall is that it rest upon sound dentin. The enamel in itself, though inelastic, is given a certain degree of elasticity when supported by the dentin. There can be no substitute for dentin as a support for the enamel wall for we have no way of determining the amount of cementing substance that has been dissolved out from between the rods by the backward decay of enamel and therefore little idea of the actual strength of the enamel itself. It, therefore, becomes imperative that the enamel be supported by sound dentin if permanency is desired. The second requirement of a strong enamel wall is that the rods which form the cavo-surface angle have their inner ends resting upon sound dentin. A very little study, microscopically, of sections of abraded teeth will demonstrate that nature has provided the greatest possible strength for the enamel wall as it is worn away, and we may well imitate in our cavity preparation this form of enamel wall found upon abraded surfaces. In these cases the rods forming the cavo-surface angle always run directly to the dentin and are supported by a triangular piece of enamel in which the inner ends of the rods rest upon sound dentin and the outer ends are exposed upon the abraded surface. So in the preparation of the enamel wall we should make the last mentioned condition the third requirement if strength is to be obtained. The fourth requirement of a properly-prepared enamel wall is that the cavo-surface angle be trimmed or beveled. This bevel should include from one-fifth to one-third of the enamel wall and incline from 5 to 15 degrees centigrade from its general direction. In terms of the structural elements of the enamel we have two general classes of cavities: *First,* those in which the rods incline toward the cavity wall and, *second,* those in which the rods incline away from the enamel wall. In cavities of the first class it is not always necessary to bevel the cavo-surface angle and this is to be done only when the rods which form the angle are in danger of injury. In cavities of the second class the cavo-surface angle is beveled in order to gain support for the marginal rods. I believe that the preparation of the enamel wall should be practically the same in the insertion of all filling materials with the exception of possibly a very slight variation, if porcelain or artificial enamel is to be used.

AREAS OF WEAKNESS FOR ENAMEL MARGINS

Although the first and most important requirement of a strong enamel wall is that it rest upon sound dentin, there are still special areas of weakness in the tooth crown where a wall should never be placed even though it fulfill this requirement. These special areas of weakness are found mostly over the points of the cusps and marginal ridges and it is as important to avoid placing the wall in these areas as it is to prepare it properly. If decay, beginning upon the occlusal surface of a bicuspid or molar, has not progressed to the tip of the dentin buccally or lingually, mesially or distally, the wall may be placed in the axial plane. If the decay has progressed to the tip of the dentin the wall must be carried over well into the horizontal plane and not placed directly over the point of the cusp or marginal ridge, since the enamel in this region, while having great strength in the natural tooth crown, becomes an area of weakness for enamel walls because of the lack of support of the enamel rods. The enamel of the occlusal wall of mesial and distal cavities of bicuspids and molars is for the same reason an area of weakness for the placement of cavity walls and because of this I believe that the majority of these cavities should be extended over upon the occlusal surface and the cavity made proximo-occlusal. For the same reason the lingual margin of simple proximal cavities in the incisors and cuspids should always be carried well over upon the lingual surface, thereby placing the wall in a location where it will withstand the stress to which it will be subjected. I do not say that it is always possible to prepare ideal cavity walls, but I do believe that the nearer we approach the ideal, the more permanent will be our operations. At any rate, we should do as Emerson has said: "Hitch our wagon to a star."

In conclusion I will say that it has been my aim in the presentation of this paper simply to review the histological structure of dentin and enamel with the view of making clear the practical application of the knowledge of their structure. Lack of time has necessitated the omission of many important points which otherwise would have been included. I have quoted largely from Dr. Black and Dr. Noyes and have used as guides in preparation their recent textbooks. I firmly believe that a definite knowledge of the histological structure of the tissues of the teeth forms the corner stone of the foundation of the successful practice of operative dentistry.

DISCUSSION

Dr. L. W. Bentley: Dr. Stillson has given us a very interesting and instructive paper in his "Review of a Few Points of Practical Importance in the Histological Structure of Dentin and Enamel."

We may be more or less adepts at mechanical methods of restoration of the teeth for functionating or preventing their further breaking down or loss, but all of us must keep in mind the histological structure of the tissues we are working upon or our mechanical means are utter failures.

The dentin is the all-important part or structure of the tooth and is the basis upon which the outer tissues depend for their support.

In the inward development of dentin we find one important fact—that of keeping a live pulp. Nature supplies the only means of defense in the odontoblasts and after the death of the pulp these cease functionating. They alone can deposit the so-called secondary dentin, keeping the pulp at a safe distance from outside irritations.

Oftentimes we are confronted with excessive sensitiveness of teeth after the placing of metallic fillings and unless this ceases, the death of the pulp is inevitable. Would it not be far better to remove the metallic menace and apply soothing treatment than to have the patient under the painful necessity of keeping free from thermal changes in the oral cavity?

We are obliged to preserve as much dentin as possible for the retention and strengthening of the enamel walls; the entire removal of all carious dentin is necessary and we cannot substitute any metallic or cement substances to strengthen these walls.

The solution of the cause of sensitiveness of dentin seems yet to be possible of more research, but to quote from Dr. Stillson, "the protoplasmic processes of the dentinal tubules connecting directly with the odontoblasts, they in turn being in direct protoplasmic relation to the nerve endings." The fact of the branching and anastomosis of the dentinal tubules at the dento-enamel junction necessitates precaution in the preparation and fitting of banded crowns as well as injuries to the gums at the cemento-enamel junction, thereby allowing of the ingress of decay. Here the anastomosis allows of easier access to the dentinal tubules and rapid decay is positive.

Dr. Black, as our essayist has stated, presents and backs up the theory that "differences in density or percentage of lime salts in teeth, have *no* influence on the liability to caries."

Histologically, enamel is built up of layers of enamel globules, constituting enamel rods; both held together by a cementing substance. That cementing substance between the rows of globules is known as interprismatic cement. Both the cementing substance and globules are derivatives of calcoglobulin. The cementing substance being soluble in weak acids is more readily attacked by the acid secretions of the oral cavity and the lactic acid formed by the plaques or colonies of germs deposited upon the surface of the enamel.

Variations in the percentages of interprismatic cement substances acted upon by these dilute acids would cause variations in the amount and rapidity of chemical disintegration.

We cannot speak of hard and soft teeth, even in that respect; but, nevertheless, there would naturally *appear* to be some difference chemically.

Unless we, as individuals, go into research in these histological questions we cannot but accept the theories which sensibly appeal to us and seem most reasonable. We cannot conscientiously attack any theories advanced without profound knowledge of the subject from a biological standpoint.

Histology itself is only one of the many branches of the great subject Biology—a knowledge of which, in general, can assist in discoveries of the work of nature in building up the human body.

There can be no criticism of the paper and the able manner in which Dr. Stillson has handled the subject. Only the emphasizing of some of the important points as concerns the work of the dentist is the object of this short discussion.

Dr. T. J. Hill: How many times the permanency of our work has been impaired because we have been unmindful of the histological structure of the tissue upon which it rests! How many times have we had patients return to our office with the lingual or buccal wall of posterior teeth split off because the enamel had insufficient support! Another common mistake is the excessive beveling of the cavo-surface angle. For the placing of all brittle fillings, including amalgams, care should be taken that the angle formed by the enamel walls and the cavo-surface should be very small and the depth of the cavo-surface should be at least one-third to one-half the depth of the enamel.

It is only a too-common sight to see occlusal amalgam fillings where the amalgam has fractured to the depth of the cavo-surface angle. I wish to call attention to the direction of dentinal tubules in the crown portion of the tooth and their importance in high-pressure anesthesia for cavity preparation. Because of the F shape of the tubules, the point of contact for cavities at the gingiva should be made directly above the carious portion. Owing to the fact that the free anastomosing of the dental tubules is in that third portion of the dentin nearest the dento-enamel junction and that portion already destroyed by caries, the anesthetizing of cavities of this class is very difficult unless the cocain solution has been forced to the pulp, and we should ever bear in mind that the tubules around caries contain micro-organisms beyond that portion of the tooth which we commonly speak of as carious, and extreme caution should be used to prevent the forcing of these micro-organisms through to the pulp. I believe that if the operator intends to anesthetize the pulp, he is justified in making a cavity for the point of contact in another portion of the tooth. In making the point of contact directly above the caries we can take advantage of the histological construction of the dentin. I believe that the death of the pulp following the use of the high-pressure syringe is caused many times, not by the over-anesthetization of the pulp, but by the forcing of micro-organisms into the pulp.

The essayist suggests the use of a two-per cent. solution of silver-nitrate for sensitiveness of nude portions of the root. Full strength formalin seems very effective in cases of this kind and has the added advantage of not leaving any discoloration. It would, indeed, be interesting to know how the dentinal fibrils perform their physiological function of preserving the quality of the dentin.

Pickerill, in a recent article on dentin and enamel, has shown by microscopical sections that the sides of enamel rods, as they near the surface of the enamel, diverge, making the prism approach a hectagon cone. In support of this, he shows sections made from near the dento-enamel junction and the surface of the same tooth in which the enamel rods near the outside of the enamel are much larger in diameter than near the dento-enamel junction. By this he accounts for the larger area to be covered because of the contour of the tooth surface. The greater the contour, the more the conical shape of the rods. The belief held for many years has been that the larger area near the surface of the tooth was accounted for by short enamel rods starting in the body of the enamel and running to the surface. This he believes to be a fallacy and says that the rods that appear to be short rods in a microscope are long rods coming up from between as they curl and twist on their way to the surface. He also does not believe that the endoblasts have the power of generation and finds no way to account for the formation of the shorter rods.

I should like to consider for a moment the very delicate subject of hard and soft teeth. I am inclined to believe that if we study these conditions from the same viewpoints that Drs. Black and Head have, we will find that, after all, their work has not been contradictory. While Dr. Black's work has been based on normal enamel, Dr. Head's work is entirely with what I shall call pathological conditions. He brings out two startling ideas: First, that, while the action of acids upon enamel dissolves the calcium salts, leaving it a chalky mass, this action is very greatly retarded by the presence of saliva. He says, for instance: "One to one thousand lactic acid and water at mouth temperature will cut tooth enamel thirty minutes with a rough white surface. A tooth placed in one to five hundred lactic acid and some salivas will be unharmed." Second, he brings out an even more startling theory when he says that his experiments prove that enamel, softened by acids, if put in normal saliva at body temperature, will recalcify. If this be true, can not the apparently soft teeth of pregnancy and the proneness to caries during illness be accounted for by a changed condition of the saliva, and could not the conditions again be remedied by the return of the saliva to normal? We know that any breaking down or repair of enamel by way of the dentin and pulp to be a physical impossibility, therefore, any changes which may come to enamel must be by chemical action from without, and, if calcium salts can be chemically dissolved from the enamel, is there any reason why a chemical action cannot again deposit them?

Dr Pickerill partially upholds the work of Dr. Joseph Head for he says: "All that is to be learned about an organ is not to be acquired by the microscope alone; that tissues with apparently identical structures may have quite different properties. I believe that the physical differences between sclerotic, or hard, and malacotic, or soft, teeth are in part, if not wholly, acquired after eruption and, further, that it may be possible to bring about such an acquisition.'' He also shows sections where there is apparently a cessation of enamel—the physical properties of which enamel seems to vary greatly from the normal.

But these are pathological conditions, not normal enamel. And it would not be surprising if the day would yet come when we will be called upon to treat pathological conditions of enamel by the control of salivary secretions in our effort to attain that one great goal, viz., prevention.

ONE MAN'S COMPARATIVE OBSERVATIONS OF NITROUS OXID AND OXYGEN ANALGESIA AND HIGH-PRESSURE ANESTHESIA *

BY L. J. WALKER, D.D.S., GRAFTON, W.VA.

THE "ONE MAN" REFERRED TO in the title is myself, and as the following is a narration of things relative to the subject as I have found them, my own experience, or as I have seen them in the hands of others, I must have the privilege of using the pronoun in the first person as often as it pleases me and beg of you not to allow it to jar you.

There is very much on the subject of the methods above mentioned not in the "Things-as-I-Have-Found-Them" realm, that has come to my mind, which could modify this "paper" greatly; but I shall try to exclude that.

One man's experience and opportunity for observation is necessarily very limited, therefore, there is large scope for error in ultimate conclusions. I ask you, my hearers, to speak freely in discussion, giving your individual experiences, observations and opinions whether coinciding with or sharply contradicting my own.

I hope to absorb more light than I impart, especially on the subject of nitrous oxid and oxygen analgesia, and unless you frankly and freely state what you know to be facts, thus obtaining an accumulation of same, I will feel illy repaid for my labor in the preparation of what follows.

Before proceeding I want to admit actually knowing little about nitrous oxid and oxygen analgesia. I have read much, heard much, but have practiced it only two months. I know I have much to learn. I feel that it is going to be a great interceptor of pain, that I want to know all I can find out about it, that to do justice to myself and patients I need it. I want you to remember that what herein appears is only what I have personally observed. It describes the way I see it at present with my admittedly small experience, so small indeed that I no longer believe that "little experience is necessary," that the office girl is "qualified after a few easy lessons," and that you "get things started, watch them a bit, then forget them and proceed with operating."

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*Read before the West Virginia State Dental Society, 1913.

My experience of three years with high-pressure anesthesia gives me more than reasonable assurance that what I will give you on that subject is very near the truth, regardless of some theories and opinions *per contra.*

My first comparative observations of the two methods formerly mentioned were made three years ago at this society's meeting in this building, when a clinic was given on each subject. Two years or more previously I practiced for a period of about six months with high pressure. Due to lack of patience necessary for a beginner, improper instruments, and a lack of knowledge pertaining thereto—conditions I did not then recognize—my failures were more than 75 per cent. Not being reliable, as I then considered, it was "scrapped." Thereafter an article on "high pressure" was to me a sign of the proximity of "hot-air" and I "sidestepped."

Previous to our meeting here in 1910 I had concluded to try nitrous oxid and oxygen for the excavation of sensitive dentine, in the near future. I was, therefore, much interested in the coming clinic on the subject, and when the time came watched it closely. Three or four cavities in the upper incisors were prepared satisfactorily enough as far as the absence of pain was concerned. Considering the unfavorable environments and imperfected equipage, the clinician, Dr. Roberts, did better than some demonstrators I have seen since.

The cost, in the broadest meaning of the word, of the analgesia secured was quite disappointing to me. The patient showed signs of much discomfort and inconvenience occasioned by the necessity of breathing via the inhaler, its contact in adjustment, and the lip being forced against it by the operator, as same was being elevated to make cavities accessible. This interference wasn't completely overcome.

The operator, while he had an assistant, evidently had his attention much divided between the operation, the administration, and the condition of the patient. This was necessary, it appeared to me then, and always has since. No wonder then that the cavities were prepared in a hurried manner, instead of the studious deliberation that makes for thoroughness. The patient also showed signs of discomfort for some little time after the operation.

The disposition of the saliva seemed to me an annoying factor. In my own experience I find it an objection that I never expect to overcome.

In a dozen public demonstrations that I have seen since, I have never witnessed three in succession that did not present two or more or all of the inconveniences just described, with some additional ones.

At one I saw a complete failure to tolerate operating in the analgesic state, and had to be carried into complete anesthesia, where a patient becomes a difficult proposition for a lengthy operation.

At another, the subject projected with considerable force the contents of his oral cavity over the fair bosom of the pretty assistant. It might have been the operator.

At two others, the subject had to be carried so close to the second stage of anesthesia that had the operation required, say, half an hour's time, the occasional passing into the second, where excitement and restlessness resulted, would have been very annoying.

I have no doubt that most of these objectionable features do not accompany a perfect administration; but these were considered capable demonstrators and this point seems clear to me, namely, that it requires a great deal of thoughtful observation and experience to ripen one's judgment and skill to a degree that will eliminate the probability of such occurrences without the privilege of choosing one's subjects. This, of course, is no excuse for not employing a good method, to which class nitrous oxid and oxygen certainly belongs; but in that particular feature I at present have reason to believe that it has at least no advantage over the high-pressure method.

Returning to the meeting here three years ago, the high-pressure clinic was about to begin when Dr. Roberts finished. With a mind disposed to criticism I went to observe the method I had "scrapped." There were only a half dozen other observers, and I would hardly have been one had it not been for the feeling that Dr. Jackman's personality had inspired in me that he would offer nothing that was trifling.

There I saw dentine, that was first demonstrated to be exceedingly sensitive, rendered, not relatively, but absolutely, insensitive. The apparatus used was strikingly simple in comparison. There was no apparent discomfort of patient, after demonstration of sensitivity, throughout the entire operation.

The operator's whole attention was given to the desensitizing for about fifteen minutes. That done, no further attention was needed there, and it was wholly directed to the excavation of a disto-occlusal cavity in a first upper molar, requiring about twenty minutes to properly prepare for a filling.

The forcing of the drug through the dentine seemed to be no difficult task. The operator's mind showed not the least sign of worry about obtaining desired result, or being in a hurry to get through with the excavating. No need for the aid of suggestion; no necessity for an assistant, while one could have saved some time by preparing the anesthetic, and afterwards by keeping a current of cold air on the cavity—not to prevent pain, because pain was impossible, but to prevent the development of heat sufficient to injure the pulp, which could readily happen in rapid and prolonged excavation.

Another favorable feature was the entire absence of any kind of apparatus about the mouth to prevent the approach of the area of operation from any desired angle otherwise attainable. Again, there was no more trouble occasioned by the disposition of the saliva than ordinarily pertains. The mental condition of the patient remained entirely undisturbed, and it was not at all likely that she was apprehensive about after-effects, as she would likely have expressed it, because of the feeling that a powerful gas or drug had been used.

That clinic completely removed all doubt in my mind as to high pressure being the thing most desirable in the hands of a dentist for the interception of operative pain if the average man could but master it, and the results to the pulp were not undesirable. About the latter I had not much doubt, because of my former experience. The former, Dr. Jackman assured me, I could acquire if I would but persevere with proper instruments. Today both questions are so definitely and so satisfactorily settled in my mind, that it requires no great courage to tell you that I believe my judgment is good in declaring that as a preventer of pain during operations on sensitive dentine no method yet generally heard of excels it, when all things pertaining are considered.

It seems strange that if this method has the merit, we should be so slow to find it out. A number of the dental surgeons, really great servants, have histories of being ridiculed, some unnoticed for many years, others bitterly opposed.

None of us are strangers to the adverse history of anesthesia. Cocain was discovered more than a half century ago, but it took twenty-five years for the medical and dental professions to awaken to its remarkable value. Amalgam as a filling material was long repudiated.

High pressure, with its virtues, has some faults; but the former so far outnumber the latter, that I am convinced we err by rejecting it on that account. Where it is not as practical as could reasonably be desired, N_2 O and O analgesia overcomes the objection very often. Where the latter method is weakest, the former is generally a most efficient servant.

To be more definite, supposing the case to be the preparation of a sensitive cavity that will probably require five minutes or less after same is opened, which is usually painless anyway, or that there be several such, fairly easy of access. In such case N_2 O and O serve me best, principally because I save my time and the patient's. It takes no longer to anesthetize for them all than for one, and not quite as long for one as it would with high pressure. Furthermore, I would probably put my patient to less inconvenience with one short period of analgesia than I would with several local anesthesias. Again, if these cavities were in the anterior teeth I would probably have several pits, those drilled for injection, to take care of.

Where pericementitis presents, high pressure is contra-indicated if for no other reason than because of the pain resultant from the pressure necessary. In such cases I find analgesia is often quite helpful, only mitigating the pain however, but that is well.

I sometimes find that prolonged pressure on teeth in the lower jaw causes a feeling at the point of articulation that is annoying and uncomfortable to the patient. There again, unless the operation promises to be quite lengthy, I resort to analgesia. In the latter case I feel that high pressure will give the least inconvenience even at that. On the lower jaw I find the inhaler less obstructive than when operating on the upper. This sometimes determines between the two.

Supposing the case to be one of hyper-sensitive teeth having one or more cavities difficult of access, troublesome and difficult to open, extensive extension for prevention indicated. Or suppose it be the trimming of a live tooth for a crown, an inlay, or a fixture to anchor a bridge, a Carmichael attachment, for instance—in these I consider nitrous oxid and oxygen analgesia highly impracticable and an injustice to ourselves and patients with such a method as high pressure at our hands. Why? First, because of the great advantage of ''the one-thing-at-a-time'' feature. We devote from ten to twenty minutes to desensitizing the field of operation only. When that is accomplished, and it cannot possibly be more completely done, nor with more safety to patient and tooth, not the least further thought need be given that matter for at least a half hour, possibly an hour. Now there is nothing to interfere with the concentration of the operator's mental and physical activities on the operation proper. Every piece of former equipage can be laid far aside. Not one of the patient's functions are in the least disturbed. There is no impediment to the speedy disposal of saliva and debris. These conditions so expedite the work that the time spent anesthetizing is probably regained, leaving us the advantage of making a fee for time (which is ours to sell) spent in high-class service, without having to add to our patient's expense or else deduct from our profit, the considerable cost of a manufacturer's service (which is his to sell) namely, gases. In other words, we are selling nobody's product but our own, and that advantageously, particularly if time has been saved.

Now let us suppose that several such cases present in the same mouth and it is desirable to operate on all at the same sitting. I have never found a reason for limiting the number of high-pressure treatments on the same patient at the same sitting. At present I believe that we should avoid, if we can, the state of analgesia for long periods, or a number of shorter ones consecutively administered in a sitting of two or three hours. It is not an unusual thing for me to anesthetize four or five teeth in the same mouth, at one sitting.

The removal of a live nerve from teeth that for some reason or other we deem necessary, even though sound, or at least without an exposure by caries, is an easy operation with high pressure. While with nitrous oxid and oxygen, I am told, (I never tried it because I am not looking for anything better than high pressure in such cases) that exposure of a pulp and attempted removal is accompanied with pain and necessitates carrying patient into anesthesia. Who wants to remove the nerves from a molar tooth with a patient entirely helpless, an inhaler in the way, likewise a saliva ejector, plus rubber dam! Of course, we wouldn't do it that way. With high pressure the nerve can easily be completely anesthetized before pulp is exposed so that subsequent exposure and removal to apices is without pain or hemorrhage. I will be glad to demonstrate this if I can get such a case.

I frequently resort to high pressure when a tooth presents with pulpitis, and is not readily anesthetized by ordinary pressure, such as we all practice.

In three years I have anesthetized by high pressure 2,841 teeth. Out of that number I have had to remove, subsequently, the nerves from fourteen in consequence of probable faulty application. Nine occurred in my first year's experience. Four of these nine were injected through slightly carious dentine and pulpitis, either septic or otherwise developed. The other five developed pericementitis with pulps entirely disorganized. These I feel were strangulated, by over-injection. The former may have been the same, but with some degree less, or it may have been due to septic matter being carried into pulp, which is most likely. Not all teeth injected through carious dentine developed trouble. I find it bad practice however.

In the past two years I have had but five unfavorable results. Two of these, I believe, need not be so classed, one of which I found to be still anesthetized the day after. I just happened to discover it. The patient was not inconvenienced. I mistrusted, opened into pulp, when it responded readily enough, circulation seemed right but I extirpated. Subsequently I had a similar case, same patient. I waited. After fourteen months this tooth was alive and healthy. The other case was a girl of 14. I had never worked for this patient, who was anemic, exceedingly nervous and predisposed to hysteria. Within twelve hours a pulpitis developed that, at the time, seemed to me alarming. I anesthetized again and removed. Later, with a better knowledge of my patient, I concluded the symptoms were a mere suggestion, but were sufficient to make one in her state of "nerves" believe her tooth was aching. Of the three remaining cases one developed violent pulpitis after six months. This tooth had not ached previous to operation, which was an inlay, large, cervical, patient 50, tooth considerably abraded. On opening into this pulp I found a pulp-stone. I question whether high pressure was at fault. Another tooth was quite painful to thermal shocks immediately after operation. Cavity was large and somewhat sensitive to heat and cold, previous to operation. Am quite sure there was no exposure, and pulp was well protected with non-conductor. Again I think there is some question as to cause. The last one I think was a plain case of over-injection; intending at the start to remove pulp but finding it was not necessary, allowed it to remain. I found the pulp disorganized four months later.

I have had opportunity to examine very many of my high-pressure cases since operation, at times varying from six months to several years. I have found no others that I have reason to believe have been injured in consequence of the anesthesia. The post-operative sensitivity of some teeth I find is somewhat augmented but remains inconsequential. Whether this is due to the anesthetic, or the fact that the cutting has been more extensive, I am not prepared to say. Where I anticipate this condition, and it is convenient, I close cavity with *gutta percha* for a few days.

While most of my failures were in my first year's practice of method, my operations were far more frequent since then: making the percentage of unfavorable terminations as small as we could expect of any method for anything we perform.

Another line of observation I think worth noting comes from the patient's experience. I have had opportunities to use both methods on the same patient. One is the case of a girl of 17 years, my patient for the first time. Having partly prepared two approximal cavities, pain became quite annoying. I resorted to N_2 O and O and finished to my satisfaction. "Didn't that help wonderfully?" I inquired. "Didn't you see me hold quiet?" she said. "I never do that when it hurts." "You didn't feel it at all, did you?" "Yes, I felt it, but you said it wouldn't hurt and I can't say it did."

An hour later I was operating on another tooth in the same mouth when pain again interfered. Without saying more than "Never mind; I'll fix it so it will not hurt again," I proceeded with high pressure and prepared two cavities that required over twenty minutes of burring. I then asked, "How did you like that?" The reply was: "If you mean the way you didn't hurt, it was much nicer than before." That not being very definite I asked if she referred to the method of taking away the pain or the feeling in the tooth when I was "drilling." "I meant all of it," she said, "I didn't find out just how you took away the hurt, and my tooth might have been wood for all the feeling it had." "But don't you think the first way was the nicest?" suggesting further that it made one feel so nice. "Indeed I don't! Why don't you always do the way you did the last time?"

I had but one opportunity to try N_2 O and O on one of my "impossibles" as I call them, because it is impossible to touch a carious surface on their teeth without what seems to be to them an unbearable pain, and precludes a satisfactory operation of any kind. We all have a few such, and we never see them or hear their names without recalling that fact, and hoping the day they will call on us for service again is in "the dim distance." This patient was a male, age about 35. I could not excavate without his feeling certain that it hurt considerably, though pain was reduced so that it was tolerable. His opinion, as expressed by himself, was, "This might do if I did not know better, but so long as you can give me the other I want it used always hereafter." He was accustomed to high pressure. Another one of my high-pressure patients resisted all arguments to try the analgesia. Several others admitted that analgesia rendered an operation without pain; but stated they did not like it as well. From it all I conclude that there is some objection on the part of the patient to the act of undergoing analgesia that they would avoid, preferring whatever inconvenience they might previously have experienced with high pressure.

Because of the fact that I expect to give a clinic this afternoon I will be brief in delineation of my technic, which is not much unlike that of others as you have all probably seen practiced or described elsewhere.

The apparatus necessary consists only of an instrument capable of forcing a liquid into or through the dentinal tubuli, plus some means of measuring the quantity of cocain solvent, some suitable form of cocain hydrochloride of known quantity, to make a solution of cocain any strength not exceeding 4 per cent., also a small container for solution. I use mostly cocain hydrochloride in filtered water boiled three minutes. I put the cocain in the water before the boiling, and put solution within its container in a vessel of boiling water.

The instrument should be of a type that will permit its application to a tooth with the least possible change of its relative position thereto in its subsequent manipulation, because more than a very slight change of the angle it forms in junction with the tooth will permit a leakage sufficient to cause failure.

After breaking the enamel with a drill made by grinding a No. ½ bur, I use a No. ½ bur to true the opening and deepen it when necessary. The depth that I bur at this point of procedure is determined by judgment of the amount of pain I will cause if I proceed at the penetration of dentin before applying anesthetic, or whether my patient or I care much if a momentary pain of no great consequence is caused. After the use of the No. ½ bur, I apply instrument to this pit at as nearly the same angle as it was burred, and in a line with the tubules, rotating slightly to wedge into enamel or dentine sufficiently to secure resistance to forcing the drug out of the instrument. If I fail altogether in this I remove and very slightly countersink pit with a No. 3 bur, when I apply again; should I again fail, I apply a minute bit of cotton saturated with alcohol to act as a packing around instrument point and failure to get resistance is rare. I do not resort to the two latter in the first place because they are mostly unnecessary.

I usually dam the tooth before applying the drug as a precaution against the introduction of micro-organisms to the pulp. This I do not find essential however, and if dam clamp will interfere, or patient is very uncomfortable in its use, I omit the damming and in such event I bathe tooth in alcohol after drying and just before applying instrument, and put a very small pledget of cotton saturated with same in the pit, I am not prepared to say that such procedure will prevent entirely the introduction of germs, but they will not be very husky ones, nor in such great numbers that the blood will not be able to take care of them. I do know that such practice, if reasonable care is exercised, is productive of no ill effects to the pulps of teeth. I, myself, and patient determine whether or not I use the dam, unless I go into a pulp, when I always apply before entering. Neither do I go to the trouble of boiling the solution if I intend to remove the nerve. I simply dissolve six neurocain tablets, which combined contain one-half grain cocain hydrochloride, with fifteen drops of Dr. Waite's local anesthetic, which is already one per cent., giving me approximately a four per cent. solution that is reasonably sterile without boiling.

As just described the chances for trouble are remote; but if I have a case that I think demands that I use extraordinary precaution, I dam the tooth and use only a one per cent. solution of cocain sterilized, on which procedure I would stake the life of the patient, other due precautions being taken. One can anesthetize with a one per cent. solution, a stronger acts more readily; I usually use a two to three per cent., except as elsewhere stated.

Imperfect contact of instrument in the pit drilled for its seating does not necessarily mean failure; of course, desired results are more readily obtained if it is without leakage, but if there is a distinctly perceptible resistance to the escape of the drug, and this can be maintained for thirty seconds, it will probably have entirely desensitized deep enough to allow the deepening and trueing of pit to insure more perfect contact, when the anesthetizing can go on to completion more satisfactorily.

There are so many considerations governing the time pressure should continue, that there can be no rule given. A beginner should remain on the safe side by the occasional trying of the tooth for sensitivity; after noting the progress made he will be able to judge how much more may be necessary.

The teeth of patients under twenty years nearly always respond quickly and, to a beginner, with surprisingly light pressure, but with considerable variance. After practicing a while many surprises of the same kind will be found in much older patients.

The strength of drug used is a condition that will modify time somewhat, but don't double the pressure if you reduce the percentage of solution one-half.

The location of point of insertion and the depth of dentine is often limited by the kind of pit obtained, some permitting only medium pressure without serious leakage, others remaining tight under a possible three-thousand-pound pressure.

Secondary dentine is a serious and uncertain obstruction.

Badly abraded teeth, and teeth with pulp nodules, are all uncertain quantities regarding the time required to anesthetize, but 95 per cent. of these will respond favorably, except when intensely inflamed, if reasonable patience is exercised.

If I am uncertain about how long to continue, and I get a strong resistance, I continue pressure while I count one to each respiration (my own), until I reach eighteen or twenty, which is approximately a minute of time. At this stage I test for sensitivity, and judge whether more, and how much, may be needed. I often deem it well to deepen the pit after such test.

I hope to be able to demonstrate this afternoon better than I can instruct you further, herein, and will be pleased if I can be helpful to anyone who might desire to practice high pressure.

DISCUSSION

Dr. C. H. Neill, Fairmont, W. Va.: In getting up and discussing this paper of Dr. Walker's I realize my inability for several reasons; the principal reason is that my experience with the two methods has been very limited.

The apparatus which I first attempted to use was very imperfect, mechanically, and as far as I am able to tell now it is impossible to obtain results. At a meeting I was persuaded to take up the matter again and it has been very successful.

I base my remarks on the cost of N_2O and O principally on articles which have appeared (one which appears in the current issue of The Summary), and also a paper that was presented to the Pennsylvania Society.

In molar conditions the patient would consume gas at the rate of four dollars to six dollars an hour. I feel that when you add a cost to your operation somebody has to pay, either the patient has to pay by an additional fee or the dentist has to pay.

I have had the experience, particularly in Somnoform, of having a patient come back in two or three weeks and say he had a terrible pain and I immediately attributed it to the powerful anesthetic that had been used upon him. The high-pressure anesthesia is very simple and you get the same results.

In my own experience with the different methods of eliminating pain I am convinced of the fact that eliminating pain bears a very important part in professional practice. However, it was my experience, with the exception of about four times, when the administrator carried me into the state of anesthesia, that I did not notice the presence of pain.

About two months ago I had a cavity prepared in a lower left molar, which was very hard to handle, and with the exception of the pain in drilling the pit for the insertion of the needle, I experienced no pain whatever. The cavity was prepared, the filling was inserted, and I had absolutely no pain.

I believe that N_2O and O has its use, particularly so in the preparation of cavities in sensitive teeth. I believe that it is very highly recommended where we have very small cavities that can be prepared very rapidly. I believe that is another case where high pressure is not very well recommended. I know that you are all aware of the fact that the dental profession is very prone to pick up new systems. Many systems that have been used have been discarded, for the simple reason that salesmen have sold their wares with the guarantee that it is a very simple method. I believe that is one of the principal reasons for failures. I know men who have taken up N_2O and O and have had no success with it. I think it is all right for the man who has the time and who can devote his time for this analgesia.

Dr. W. I. Jones, Columbus, Ohio: I enjoyed reading Dr. Walker's paper.

The trouble with a great many practitioners is that they get the impression that they do not need to understand anesthesia in order to practice analgesia. I could not make any headway with analgesia. Take, for instance, a healthy tooth imbedded in the alveolus and a live pulp in it. You drill a little hole in this tooth and attempt to press a little fluid in it, and I give as an example a large glass tube filled with water, put a plunger in it and attempt to force that down. Water is not compressible, otherwise how would our elevators run? If you place a patient in the state of analgesia to fix some teeth and that patient is sensitive, you cannot accomplish anything, in fact you cannot do anything with him.

Dr. L. Jay Walker: I want to say that Dr. Jones is correct when he says we must first study anesthesia before we can understand analgesia. My experience with anesthesia has been very extensive and without it I do not understand how I could have succeeded at all or gotten any results. I did not attempt to undertake it without first taking some instructions in it, and my unfavorable cases have been very few. In regard to the impossibility of getting any more fluid into the walls of pulp cavity, I want to say that I do not believe that it actually gets in there.

Dr. J. A. Libbey: Doctor, did you ever try water?

Dr. Walker: No, I have not, but I have tried normal salt solution. You want to be careful in injecting this fluid. I always sterilize my solution.

Dr. M. B. West, Parsons, W. Va.: What is your method when the pulp is exposed?

Dr Walker: I do not think that is a case for high-pressure anesthesia.

Dr. West: Did you ever try salts of cocain on the exposed pulp?

Dr. Walker: I have done so.

Dr. Chapman: When you put on this pressure, does it press the fluid down through the apical foramen?

Dr. Walker: I do not believe that with a careful injection that it takes place.

OCCLUSION *

BY DR. FRED STATHERS, PHILADELPHIA, PA.

APPEARING BEFORE YOU WITH such a time-honored subject, which has been so ably presented many times, would almost seem to require an apology; but instead of apologizing, I shall make the assertion that there is more yet to be learned about occlusion than has ever been written.

Too much importance cannot be attached to this subject by the dentist or the orthodontist, for it is essential to an intelligent restoration or modification of any part of the dental apparatus. Much has been written treating occlusion from a purely mechanical standpoint, but little has been said about the significance of this beautiful arrangement, interdigitation and locking of the cusps. And in all the writings you will not find a reliable rule by which you can replace lost teeth in the position which is normal for the individual. When you do find such a rule, plate trouble will be at an end. It is my hope to present in an intelligible manner some of the factors that have been operative in the production of this complex interdigitation of cusps and the form and arrangement of the teeth, for it is only by this means that we can get a clear understanding of occlusion.

There have been, and still are, a number of eminent zoologists and anatomists who have been interested in comparative dental anatomy, notably Owens, Tomes, Cope, Osborn, Scott, Osburn and others and it is to men of this type that we must look for a solution of such problems as the relation of the teeth to the empro-mandibular articulation.

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*Read before the West Virginia State Dental Society, 1913.

The most comprehensive definition of occlusion is supplied to us by Dr. Angle, who says: "Occlusion is the normal relation of the occlusal incline planes to the teeth when the jaws are closed."

The first thought that occurs to the mind after reading this definition is, "What is meant by normal?" And to my mind that is the most dominant thought in the definition, all the other factors depending entirely upon the construction you place upon that single word. A discussion of the real meaning of normal would lead us far afield, so we might say for our purpose that normal is conforming to a certain type.

An organism is normal when it is in harmony with its surroundings, or when a perfect balance has been established between the organism and its environment. A normal organism can exist only in the environment to which it is adapted. Now, should a change occur in the environment, one of two things must happen; changes must occur in the organisms in such a manner as to adapt it to its changed environment, or it must cease to exist.

The questions of inheritance of acquired characters and natural selection are too large to be discussed here, but it is to this ability of an organism to respond to the stimulus of a change of environment by changes within itself, which adapt it to the new environment and the transmitting of these changes to its offspring that we owe the highly complex organism known as man.

In the evolution of higher animals, the teeth have been a very important factor, and in none of the organs is better or more strikingly shown this variation and adaptation to changes of environment and food habits. It is the adaptation to food habits that I wish to emphasize, for it indicates the importance of teeth to man.

The strongest and most-striking evidence of evolution is that furnished by the fossil remains. The geologist has divided the earth's crust into various eras, which are represented by certain rock systems. These are the pages, as it were, in the earth's history. Here the palæntologist has traced life from almost its very beginning. The first forms were found to be very simple and the fossil remains found in succeeding rock show the more recent the animal the more complex, demonstrating that the progress was always upward in evolution of animal life.

It is found, too, that certain forms dominated certain periods, but that these forms did not disappear, but have continued with decreased intensity to the present time. I mention this only to justify my use of present-day forms, and to show that these present-day forms are directly traceable to fossil ancestors.

In examining the teeth of the vertebrates for evidence of evolution and adaptation, let us begin at the lowest rung in the ladder and climb upward. In selecting the shark for our first example, we have taken one of the lowest representatives of the fish family. The sharks and rays are much lower than true fish, being the present-day representation of the ganoids or earliest fishes. The ganoids differ from the teleosts or true fishes, in that they do not possess a true bony skeleton, depending for protection upon a calcified scaly armor. Their partly-calcified cartilaginous skeletons, however, show a decided advance over the crustaceans: 1. Protozoan, 2. Loliginidæ, 3. Plathelmintha, 4. Annelids, 5. Vertebrates.

The teeth of the shark are then, as we should expect, of the very lowest order, being simply specialized calcified cartilaginous dermoid scales securely imbedded in a tough fibrous gum, which slides over these partly calcified cartilaginous jaws, bringing successive rows of teeth into an upright position on the edge of the jaws. The teeth behind these are inside the mouth and occupy a procumbent position. This specie is, of course, as indicated by its teeth, carniverous.

Another specie of shark, the Cestracion Philippi, is provided with an entirely different dental armament, which is adapted to an entirely different kind of food. It lives upon molluscs and crustaceans, so we find in the anterior part of the mouth many small, rather sharp teeth, well adapted for scraping these crustaceans from secure attachment to rocks. As we pass backward we find the teeth increasing in size until the distal ones are quite powerful and will withstand a crushing force sufficient to break the hard shell of the molluscs.

The dentition of the teleost or fish with bony skeleton with which all are familiar, is of a higher order of specialization. The teeth are composed chiefly of dentin and probably always at least a very thin coat of enamel.

The teeth of these fishes are, as a rule, much more numerous, sometimes literally covering all the bones of the mouth. Taking the pike as an example, we find its mouth crowded with teeth, they being distributed on the vomer, palatine, premaxillary, lower jaw and inter-maxillary. The marginal teeth are anchylosed and some are quite large, but the teeth covering the vomer and palatines are specialized, raptorial hinge teeth, to prevent escape of prey in swallowing. The large teeth on margin of jaw are for killing or crippling prey.

There are some fishes, as for example the sturgeon, that are edentulous but they are supposed to be descendants of the ganoid that have retrogressed. The fishes then, as a rule, are remarkable for their great number of teeth, and that these teeth are of endless succession or lost and replaced indefinitely.

The first or primary function of teeth has, however, been clearly shown, namely, an adaptation of nutrition. We might go further and say that the most primary function is that of prehension, for among the fishes they are used almost exclusively in the catching and holding of prey.

In taking the next step we come to a very interesting group, known as batrachians and reptiles—interesting because it is the first evidence of life on land. There seems to be no doubt that life originated in the water, and here we have a form grading from one living in water to one in which the young are hatched in the water and later live on land, to forms living on land entirely.

In this class the teeth are not so numerous nor so widely distributed. As rather a high representation we might take the teeth of the crocodile. We find here a single row of teeth around the edge of each jaw. These teeth are conical and vary somewhat as to size in different parts of the jaws, but hardly enough to be of any great importance. There are, however, two deviations from previous forms that may be significant. *First*, a seeming attempt in the direction of occlusion, or we will say an apparent interdigitation, which might be taken as an attempt on the part of nature towards the systematic placing of opposing tooth structure, known as occlusion. *Second*, the first four or six teeth of the crocodile are placed in distinct sockets, while the posterior ones are placed in a groove running lengthwise in the jaw bone, to the walls of which they are securely bound by fibrous ligaments. This arrangement must not be confused with the alveolar socket of the mammals, but it certainly is a step in that direction. The teeth are of endless succession and of same general form, thus retaining the characteristics of the earlier forms.

There is a large gap between the purely reptilian and the purely mammalian forms of animal life, which represents a very long period of time in evolution. Variation and adaptation occurred, producing entirely new forms and these forms were always of increasing complexity. This was purely the age of the survival of the fittest, for there were great numbers of the variations which ceased to exist, because of inability to adapt themselves to their surroundings.

It is the rule in evolution that with the increasing complexity of the organism there is an increasing complexity of the parts and an increasing mutual dependence among parts.

In this new and relatively very much more complex form of animal known as mammal, which has been evolved through countless ages of adaptation to environmental changes constantly taking place, we must expect to find equally striking changes in the dentition, both as to structure and arrangement.

In the lower forms, it was unusual for the teeth in different parts of the mouth to differ as to the shape or function, while in mammals it is the rule, the variation in some cases being extreme, and the adaptation of these forms seems to be worked out to an absolute nicety.

The first thing that would call our attention to the more highly specialization of the dentition of the class of animals would be the absence of continuous succession, and the restriction of the animals to two sets, a milk set and a permanent set. This would indicate a more highly specialized tooth structure.

The carnivora are flesh-eating animals, and in their natural habits catch their prey alive. The incisors are diminutive, as they are practically without functions; the canine are large and set at just the right angle and position in the mouth to be effective as weapons of warfare, or as prehensile organs. The premolars are set edgewise, and as they are thin their shape precludes anything but a cutting function. The truly characteristic teeth of this order are, however, the upper fourth premolar and lower first molar, which are developed into large blade-like structures and are known as the carnassals. These teeth are situated in such a position in the jaws that great force can be exerted upon them, and as they operate very much as the blades of a pair of shears, their effectiveness in cutting up smaller animals and great chunks of meat can well be imagined. The molars are not constant, some specie being entirely without them, as they are practically useless to the most of the specie. In the bears, though, which are mixed feeders, the molars are more highly developed and abundant, the carnassal teeth still persist, though not in such highly specialized form.

The order of rodents is practically universal, as representatives are found all over the world. Here is an example of dentition directly specialized to get food that is inaccessible to other animals. This is brought forcibly to us on watching a squirrel busily gnawing through the hard, resistant shell of a hickory nut to get at the kernel within. It is evident that ordinary teeth would not stand such severe usage long; so to equalize the wear the rodent is provided with incisors that grow from a persistent pulp. The molars are made up of alternate plates of dentin surrounded by enamel and these plates fused together by a surrounding layer of cementum. The dentin and cementum wear away more readily than enamel, leaving the occlusal surface quite rough. The movement of the jaws being simply forward and back, the effect is very much the same as rubbing two files together.

The modern ungulate or hoofed animals are all fitted for a vegetable diet. There is a tendency toward the suppression of the teeth in the front of the mouth, especially the canines, and a specialization of the cheek teeth in relation to the diet. Animals living upon a vegetable diet require, as you doubtless know, a great quantity of food, and it is necessary in order that the nourishment may be extracted by the digestive juices that this food be thoroughly ground up. The jaw of vegetable feeders swings from side to side and we find the cheek teeth developed laterally. This development has occurred by the addition of cones or elevation from the cingulum, consisting of dentin covered by enamel, and these cones or cusps are soon worn off, exposing alternate layers of dentin, enamel and cementum. These markings which represent the original position of the cusp are known as Laphiidæ. The horse's teeth elongate to make up for wear, but neither the incisors nor molars grow from persistent pulp.

The most highly specialized of all dentitions is that possessed by the elephant. This animal also is a vegetarian, living under normal condition to the average of one hundred years. Taking his bulk into consideration and the vast amount of foliage of young trees, grass and other forms of vegetable diet necessary for his needs, together with grit that must adhere to the roots and the length of time that its dental armament must functionate, you will see that nature must make some special provision for this huge animal. Their tusks are used for weapons and for uprooting small trees in procuring food.

The most striking characteristic is, however, the displacement from behind forward of the molar teeth. The elephant has during his lifetime twenty-four molar teeth, but there are never more than four whole ones in position at any one time. It is indeed a very admirable arrangement, for as these millstones become worn, they pass forward and break off, a small piece at a time, and to make up for this the succeeding tooth-forms are pushed forward, gradually taking its place, as the old one is lost, thus insuring at all times the full surface of four whole molars for the purpose of mastication.

Let us now consider some forms that lead up to man. In considering the teeth of the primates I do not want to be understood as saying that man is a descendant of the monkey, but it is very generally conceded that man probably had ape-like ancestors, and must have passed through a stage now represented by some of the monkeys. The lemurs are generally considered to be the ancestors of the monkeys, and there is a greater gap between the lemurs and monkeys than between monkeys and man.

The lemurs resemble insectivorous animals in appearance and are omnivorous in diet. Living upon insects, reptiles, small birds and fruit, we would expect a diversified dentition.

The upper incisors are small and far apart. The lower are long and procumbent. The lower first premolar is canine-form, supposedly serving in place of lower canine, which is procumbent. The molars and premolars are all armed with very pointed cusps. The teeth of some of the monkeys, especially the chimpanzee and orang resemble those of man very closely, except that they are relatively larger than those of man; this, coupled with the fact that their brain case is much smaller, gives them the decided prognathous appearance. The principal difference is in the unusually-large canines or cuspid, which have a pronounced cingulum. The size of these teeth is responsible for the diastema which always exists between the cuspid and lateral incisors. One rather striking feature is the similarity of the first premolar to the cuspid, showing practically no lingual cusp, while the second premolar is well developed, clearly illustrating the transitional stage from cuspid to premolar, and from premolar to molar. The molars show all the markings of those of man, except that they are more bunadont when first erupted, but become flattened by wear.

We have a very definite occlusal contact of certain tooth surfaces, which, under normal conditions, is constant for the specie. The articulation of the tooth-bearing structure is of such a nature as to make this contact most efficient for the various needs of an omnivorous animal. The jaw can be pushed forward, bringing the incisors into position for biting, or the cuspids for tearing, and by the swinging motion of the jaw a very effective grinding mill is developed by the interdigitation of the cusps on the molar teeth. This is truly an efficient arrangement, but let us examine the teeth of man and see what greater degree of perfection of form, balance and nicety of adjustment has been attained. I do not claim that they are more efficient, but that they are sufficient for the needs, and the squaring up of the anterior corner of the lateral, the lessened prominence of the canine and relatively smaller size of the entire denture, certainly relieves the face of its ferocious appearance, making it more pleasing to the eye. A little closer analysis of occlusion will show that the arrangement and cusp relation is very definite, the mesio-buccal cusp of the upper first molar falling into the buccal groove of the lower second molar, while the mesio-lingual cusp falls into the central fossa of the lower first molar. The teeth distal to these antagonize in the same way. A closer study will reveal that the occlusal incline planes of the cusp are a very important factor, and a thorough study of their position and mutual relation is essential.

The first molars will always remain the most important of the series from the standpoint of occlusion, at least. In an article written by Dr. Angle some years ago, the first molars were called the key to occlusion. The subject was treated rather exhaustively, and well worth careful reading. His reasons for attaching so much importance to the first molars were: *First*—They are the largest teeth and firmest in their attachment and by their location the most effective in mastication. *Second*—The first of the permanent teeth to take their position. *Third*—By their length and early position, they govern the length of the bite. *Fourth*—Most constant in taking their normal position.

Now that we have pretty thoroughly gone over the subject of normal occlusion, the question naturally arises, what is meant by malocclusion and why does it occur in man? Malocclusion of the teeth has been defined as but the perversion of their normal relations. This is very true, but it is more; it is the expression of a lack of co-ordination in the development of the parts of the individual, due to a disturbance of the normal function of the parts. Examples of lack of development of parts due entirely to disuse are familiar to all and as this factor of use and disuse has been the most potent one in the evolution of tooth forms, it is, to my mind, still the most potent in all questions pertaining to occlusion.

Professor Cope is our authority for the statement that bone is formed and moulded into shape as a result of mechanical stimulation. If we remove the normal stimuli in children at an early age when the teeth are forming and taking their position by allowing them soft food instead of hard foods, can you be surprised if the bones of the face fail to develop normally? Proof of this is the almost entire lack of malocclusion in the lower animals; and to this reason if no other, we can attribute almost all malocclusion in man.

In the consideration of normal occlusion we must remember that a certain amount of variation is allowable. In any given specie of animal there will be a certain amount of variation about a given mean in a great many characters; but these variations are not of sufficient importance to make any difference to the animal. This is what is known as normal variation. This may be expressed in the teeth by slight differences in shape and position. A perfect set of teeth in perfect occlusion, which would be ideal occlusion, is rarely, if ever, found, but by aiming at the ideal we may hope to get well within the lines of normal variation, which would mean normal occlusion.

I hope I have not been so unfortunate as to cover the matter in what may have appeared to be wandering among tooth forms. The thought that I have really meant to convey is that the teeth are not so many structures composed of enamel dentin and cementum placed in the oral cavity, but that they are definite units of a whole; that they have a definite shape, a definite position and a definite function.

We find in the study of the different forms that the growing complexity of the organism was responded to by a growing complexity of the function of the organs. This was expressed in the teeth by a decrease in number and an increase in complexity of structure. It seems a long step from the great number of simple cones found in the reptile to the four highly-specialized molars of the elephant, and yet we know that this step was taken in accordance with the needs of the animal. We found that the position in the jaw was that which made the particular tooth most effective and that the arrangement was always constant for the specie. You will remember that the molars were always placed near the attachment of muscles of mastication in order that great force might be exerted upon them in the performance of their function.

It has been worked out by comparative anatomists that a definite relation exists between all the bones of the body of any given specie and it would seem strange if this characteristic had been omitted in regard to the teeth.

Professor Raymond C. Osborn has spent considerable time upon this question and he has found that in shape, size and position, the teeth do bear a certain relation to the bones of the face and to skulls.

This would seem to put extraction upon the same basis as, say the removal of one of the bones of a finger, or even the finger itself. It certainly gives the orthodontist a good foundation for his work.

Normal function is possible only when the teeth are in normal occlusion. In speaking of function let us bear in mind that nourishment is the first essential to vital activity and that the teeth are concerned in getting food, in taking it into the body, and in preparing it for digestion.

With the first appearance of teeth in the lowest vertebrates it would be reasonable to suppose the first function would be that of securing food and we find this illustrated in the great number of teeth in the fishes. But as animal life becomes higher, changes of environment and diet necessitate a similar change in the teeth.

It has been thus through endless ages of variation and adaptation that nature has arrived at this wonderfully complex, but amazing, efficient arrangement, known as normal occlusion in man. Let us then be sure of our ground before we attempt improvements.

PRESIDENT'S ADDRESS*

BY F. M. CASTO, M.D., D.D.S., CLEVELAND, OHIO

AS PRESIDENT, AND ON BEHALF of the other officers, I bid you, one and all, a most cordial welcome. I desire also to extend a hearty greeting to our distinguished guests and wish them a most pleasant and profitable visit with us. I wish to extend a welcome to the exhibitors who have come to our meeting with such beautiful and well-selected displays of dental goods, and say to them that we feel grateful for their efforts in behalf of our society.

We are here assembled to celebrate the fifty-sixth annual meeting of The Northern Ohio Dental Association, the second oldest dental organization in the world, and one of which we all feel justly proud. From the number of years of its existence and from the steady growth in point of members, financial strength and scientific attainment, it is most evident that the society has attained or reached the age of discretion, and it is most gratifying to note the harmony that exists in the organization, and the effort that is being put forth to give the Northern Ohio Dental Association the influence and standing that it is our privilege to attain.

In looking over the roll of the membership of the society it is a pleasure to see the steady increase in members and I trust that the usual number of new members will be added this year. A special effort should be made to have the younger men in the profession join with us. To become identified with a society of the character and quality of the Northern Ohio Dental Association should be considered a great privilege by any one. The present members should by their actions individually and collectively impress upon the younger men and non-members the necessity of their becoming associated with us. For by so doing, the highest standard and ethics of the profession will always be maintained. The success of an individual is largely dependent upon these essentials—being associated with dental organizations, knowledge of human nature, punctuality and system and honesty of purpose.

With your kind indulgence I will enumerate some of the things that seem of vital interest and importance to the profession.

ORIGINAL RESEARCH WORK

The National Dental Association in creating a new department to be known as the National Dental Scientific Research Fund has taken a mighty step forward. This movement is of vital interest to the entire dental profession and should have their undivided support. For fear that all of you present today are not familiar with the objects of this scientific research work, permit me to quote a few lines from the national committee of which Dr. Weston A. Price, of Cleveland, is chairman. The purposes are:

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*Address at Northern Ohio Dental Society, 1913. (This manuscript was delayed in reaching us, which accounts for its tardy publication—Editor.)

"To provide competent men and facilities for exhaustive investigation of some of the most urgent unsolved dental and oral problems in order that, if possible, we may learn how to produce immunity to Alveolitis; Pyorrhea, so-called; all peridental affections; Erosion; Enamel Atrophy; Systemic Infection from Local Foci.

To improve the metallurgical knowledge in order that we may have more perfect amalgams, inexpensive platinum substitutes, new alloys of gold and the working out of many other intricate metallurgical problems.

To get a better knowledge of the mouth and its relation to obscure neuralgias, etc. To assist in the organization and work of local dental research clubs and the establishment of national recognition in the form of prizes for the best contributions to the profession.

This research fund has already been largely subscribed to by members of the profession and the work as proposed by the national committee is practically assured. The work has received the endorsement of many of the most prominent men in the profession."

DENTAL LEGISLATION

Dental legislation should always be of interest to us. Since the controversy over the Taggart patents the profession have begun to realize the importance of eliminating process patents. There is a strenuous effort being made at the present time to have legislative measures passed that will limit or prohibit entirely the granting of process patents and I would urge every man to support, insofar as possible, any such legislative measure. I advise this without any reference whatsoever to the merits or demerits of the present Taggart case.

Another form of dental legislation that is being discussed considerably down East, more especially in Connecticut, is that of the Dental Nurse. It is proposed that a law be enacted which will provide for the services of a Dental Nurse who shall be licensed to perform certain operations about the mouth, being confined more especially to prophylactic measures and treatment of the gums. This proposition is worthy of your attention. We undoubtedly need even more stringent laws than we have, laws which, if possible, will require still greater qualifications for those entering the profession and require those already in the profession to keep abreast of the times. In this manner the public would be better protected and the status of the profession greatly elevated.

PUBLIC HEALTH

The movement for the conservation of public health is stronger and is being advocated with more zeal and energy now than ever before, and it is with considerable pride that we can point to the fact that the dental profession is being given due recognition in this great work. This recognition is, undoubtedly, due to the persistent energy of a few men. Now let us all put our shoulders to the wheel and take advantage of the opportunities that confront us.

ANALGESIA

This is the era of the practice of analgesia in dentistry. The public has been waiting patiently for years for the dentists to discover some safe and sound methods for the elimination of pain in dental operations. Analgesia has been tried and proven successful, and it will not be long until the people will demand its use. It would seem good practice for every dentist to be qualified to use analgesia in all cases where it is indicated.

EFFICIENCY AND CONSERVATION OF RESOURCES

Two of the things that should be of vital interest to the dentist are efficiency and the conservation of his resources, especially his health. Yet, no doubt, but a small per cent. of them are giving these things due consideration. Time is the dentist's capital, his earning capacity depends largely upon the amount of work that he can accomplish within a limited time. Every office should be thoroughly systematized. Every patient should be cared for and every service rendered so as to consume the least amount of time. The office should be arranged in the most convenient manner for the character of work to be done. The assistants should be trained to do the most work in the least time, a certain work in a given time. Everything concerned in the performance of his work should be facilitated to the utmost degree. By systematizing his work—thus establishing efficiency in his office--the dentist contributes a most important factor in the conservation of his health. Most of the larger manufacturing plants have established an efficiency department, which department deals more especially with the health of the employes. They realize that the efficiency of an unhealthy man is lessened just as the efficiency of a crippled machine would be. The results of those experiments have proven that the benefits accruing to both the employer and employe are enormous. If such things are true with the manufacturers, would it not be doubly so with the dentists? Does it not, therefore, behoove us to conserve our health?

The question of fees and investment should always receive consideration. The profession generally has been so deeply engrossed in the scientific development of dentistry that the commercial side has received practically no consideration. It cannot be denied, nor should we attempt to deceive ourselves into the belief, that the fee is not important. It is quite necessary that the fee should be commensurate with the service rendered. The fee should be sufficient to permit the dentist to keep himself qualified by spending the necessary time in attending dental conventions, post-graduate schools, buying the latest and best office equipment, and to take the necessary time to perform the very best service in all of his work. It should be sufficient to allow him and his family a respectable livelihood and to establish a small competency for old age. He must, however, be commercially as well as professionally honest.

STERILIZATION OF INSTRUMENTS

It has been proven conclusively by a large number of statistics gathered in recent years that the mouth is a regular hotbed for bacteria, and that it is very easy to transfer disease from one mouth to another. The establishment of sanitary drinking fountains and the use of sanitary drinking cups have been great educators to the public. The people are demanding that the dentist keep his office and instruments clean. It is, therefore, extremely necessary that all instruments used in dental operations be thoroughly sterilized.

Last year a committee was appointed to draft a new constitution and by-laws for this society. The committee did its work and presented it to the executive committee three months previous to the meeting in accordance with our present constitution. This was done so the society could adopt them at this meeting, if it so desired.

The society is to be congratulated for the very excellent program the executive committee has arranged. We have reason to feel proud and honored by the distinguished guests that are to be with us.

In conclusion, I wish to thank the members of the society for the honor bestowed upon me a year ago and to ask for a continuance of your generous and indulgent spirit through the sessions of this meeting, and assure you in advance of my most grateful appreciation. I wish also to thank the members of the executive committee for their good, consistent work and for the many courtesies they have shown me and thank the other officers and members of the various committees for their hearty co-operation and advice and the diligent manner in which they have performed their duties. It would have been impossible to have had such a splendid program to present and to have had the prospects for such a splendid meeting had it not been for the united, untiring and unselfish efforts of all the officers and committees. I again thank you for the honor bestowed upon me.

A little man may rattle around in the world a long while, but is sure to find his corner at last.

It is strange that frowns should be worn by some people who could not possibly be induced to wear anything else that did not become them.

A wise man among the ignorant is as a beautiful girl in the company of blind men.—*Iaadi.*

WHAT CAN I DO TO EXTEND THE ORAL HYGIENE PROPAGANDA?

BY J. B. ROBINSON, BALTIMORE, MD.

THIS QUESTION FACES US with the implication of duty to perform. To have one's duty clearly put before him is but to exert every effort to discharge the duty, if the individual is awake to his real mission in life and faithful to his obligation to his fellowmen.

Our business in life, regardless of profession, trade, or calling, is of servant to the people. We may feel a hesitancy in admitting servitude but such is our relation to society, and as compensation for services rendered we must look to the social group. That we may serve it is necessary for us to contribute something that will render society more productive, more efficient, and more lasting; and as men, and particularly professional men, we must determine our real place in the present civilization and put forth our greatest effort to work in conjunction with all other institutions for advancement and uplift of society.

The knowledge gained through my course in college leads me to believe that no more important feature exists in the whole realm of oral practice, nor one in which I may be more beneficial to society than the extension of the oral hygiene propaganda, both by preventive practice and public enlightenment of the importance of proper attention to oral hygiene. Being conscious of my duty I shall make every effort to consummate the work so far as it is within the power of a single individual to do, and for the present will hold in mind a course of action which seems to me practicable and which I will attempt to outline.

In order for the idea of oral hygiene to become firmly established, it is necessary for the public mind to be educated to its importance. No revolutionary methods can be employed to permanently bring about an era of advanced thought and action. An evolution of thought through educational campaigns must be brought about, and the oral specialist must realize that upon him rests the responsibility of furthering such work and preparing society to appreciate and receive the blessings which he can provide suffering humanity.

The first point of attack in urging the work before us is to bring our proposition to public attention. For the work to be successful and as far-reaching as we would desire, it will be necessary to engage public opinion and popular sentiment. We may seek the public school as the most practicable avenue of achieving our desires, and this may be done with apparent success, but the popular favor must be courted or the work begun in the school will soon be neutralized by popular opposition led on by cranks, of which the world contains many.

The very best avenue for educating the public is by means of the press, and we are confident that much can be done along this line, if sufficient thought and enthusiasm are employed. The idea of teaching oral hygiene to the public by the use of the press should consist of a series of articles on subjects relating to the topic under discussion. Some of the subjects which it might be well to introduce would be, the anatomy of the mouth and adjacent parts; the function of the dental organs and the relation they bear to general health; the teeth, temporary and permanent; their care and why the individual should regard this as part of his body cleanliness; local diseases resulting from neglect; general disturbances associated with, and probably caused by, neglect: the handicap in life to those who suffer from results of poor oral conditions; the relation poor nutrition and poor mouth conditions bear to his or her work in school; and many other topics that could be made very interesting and instructive. In teaching the subject from this viewpoint it should be done in a simple and attractive manner so that the child would be won and could understand, while at the same time it would interest and educate the parent.

Again, the public mind can be enlightened through teaching the patient in the chair the necessity of proper care of the teeth and oral cavity generally. It should not be too great a hardship for the operator to instruct his patient in the art and technic of proper care of the mouth. He will have to get away from the fear that he is giving more than he is receiving pay for, and work with the idea of the general good, for in this manner he can uplift the profession and place himself in a position to profit better from his services. His reward may be indirect, but it will be as stable and satisfying as the jingling of the elusive but much-sought-for dollar.

At the time of emphasizing the need of special attention to care of the mouth the operator should always put the mouth of his patient in the best possible hygienic condition. This silent argument will win more enthusiastic converts to the cause than anything that might be said. In my brief experience in the infirmary I have felt the meaning of this through the effect it has had on returning patients when I have put the mouth of one in good condition. What holds true in the infirmary, in a limited sense, will certainly hold true on a large scale when one is out in practice.

The third direct way of reaching the public is by the platform route. Not every one is so talented that he can appear before an audience with such a subject in hand, and hold the attention and enlist the interest of his auditors, but if he is sufficiently enthusiastic he can do much to carry the idea home to the minds of his hearers. His lectures should pertain to the importance of attention to present conditions and the evils resulting from neglect. This feature may and should be supplemented by pictures illustrating the conditions we are attempting to correct. If such work is carried on as it should be, the public will soon come to realize the imperative need of better attention to preventive measures in caring for the teeth.

The second field of operation in dealing with the oral hygiene propaganda is that of the public school. This has been done in many cases, and in fact, most of the advancement along this line has been made in our schools.

The first step along this line is to be sure that the teacher herself understands her relation to the movement, and understands her place in extending the work for the benefit of the pupils. As a rule a teacher is responsive to the thing that makes for progress in her work and the advancement of her pupils, and because of this attitude of mind on her part there should be no difficulty met with in equipping her for the work which she must direct. This may be done by the orist offering a course of lectures tending to adapt this feature of hygiene to the general school work. After this he might recommend certain literature which would assist her in securing a better knowledge of her subject. It could be pointed out to her what other teachers have done and by their experience she could profit.

After having interested the teacher it would be well to speak to the classes of higher grades, teaching them the things they should know and the duty they owe themselves to keep their oral cavities in proper condition. This would encourage the teacher, and coming from one in a position to know, carry more force than from any one else.

Having interested the teacher and pupils the orist may begin his own work by devoting some part of his time to examination of the children's mouths, making charts of conditions found, and of recommending to the pupils what they should do. He should instruct all of those who might be able, to go to the family orist; those who might not be able, could be cared for, at least in part, by establishing a free clinic for the poor. In his atttempt he might make his appeal to the school authorities for assistance, and if the method I have proposed has been closely followed there certainly can be no strong opposition to prevent a board of directors from establishing a free oral clinic. I am conscious of the troubles that have attended such efforts in different parts of our country, but persistence and profiting by the mistakes that have been made will finally secure the thing for which we are striving.

Two features should be introduced into the school that would be of the greatest importance: First, the tooth brush drill, and second, competitive features to stimulate interest. The tooth brush drill is efficient and habit-forming and the teacher can introduce this work with little effort and expense. In the second case the child should be called upon to write his or her reason for believing the mouth should be properly cared for, and the one showing greatest merit should be rewarded. Again, the one making most progress in the case of better attention to his oral condition might be awarded an honor. If the school as a medium is properly utilized and is worked in conjunction with the education of the public there is no doubt of success.

Finally, I should say the home should be entered in order that the work may be thorough and final. It is a lamentable fact that there are thousands of mothers who undertake the responsibility of motherhood who are absolutely unfit to care for the life they bring into existence. It is a part of the business of mothers to know how to care for this physical body placed in their hands, and it is their duty to discover how to do it well. It is my place to instruct the mother in the proper care of the mouth of her infant. I may do so by word of mouth or by placing in her hands literature pertaining to the subject. At any rate, I must acquaint the mother and establish the idea in the home.

The oral cavity, as a part of the human body, should be as scrupulously cared for in a hygienic sense as any of its other parts. No careful mother would permit her infant to live over twenty-four hours without having bathed its entire body for protection against disease which will result from unhygienic living; yet it is rare to find a mother who cares for the mouth of her child after feeding, that it may be clean, and no opportunity given for development of harmful growths which will result in systemic disorders.

No conscientious teacher will permit a child to come to school day after day and sit with unclean body without availing herself of the opportunity to emphasize the importance of body cleanliness; yet she will suffer a child to come for months with a filthy oral cavity, which exposes the entire class to possible contamination, but rarely, if ever, instructs the child in the procedure for improving conditions. No adult with the self respect of the average social being would permit himself to remain unclean in body for any period of time, be his position public or private; yet the majority of people in daily life are very negligent of mouth conditions, and permit the oral cavity to become a breeding place for micro-organisms and diseases, which are more dangerous to life than any of the unsanitary conditions about our cities of which we hear so much. To correct these evils it is necessary to wage a campaign of education, the object of which shall be to acquaint the public, the teacher, the mother, and the child with mouth conditions that they may be able to live in the best possible physical condition.

Some people imagine they are in the swim when as a matter of fact they are only in a rut.

Optimism is one of the best aids to an attractive personality. To cure even one person of despair is no mean task.

People who intend to have their own way should always find out first if everybody else is willing.

NITROUS OXID AND OXYGEN AS A GENERAL ANESTHETIC*

BY W. I. JONES, D.D.S., COLUMBUS, OHIO

HISTORY

THERE IS VERY LITTLE DOUBT in the minds of students of the science of anesthesia that one of the great advancements in general anesthetics is the use of nitrous oxid and oxygen. Among all the modern methods that are being introduced for the purpose of increasing the safety of surgical operations, nitrous oxid-oxygen anesthesia easily surpasses them all.

Nitrous oxid was discovered by Priestly in 1774. This fact alone seemed to satisfy the scientific world for more than seventy years until Horace Wells, of Boston, in 1844, conceived the idea that it was an agent capable of producing anesthesia, and he, in order to prove the correctness of this notion, submitted to the operation of having a tooth extracted while under its influence. From that time on until his death, which was greatly hastened by the indifference and lack of interest taken by the medical profession in his great discovery, he hoped and schemed, amidst the reproaches of his fellow practitioners, to perfect some way of producing general anesthesia, until finally in despair, in January, 1848, he opened a vein, securing a painless death by the inhalation of ether. A number of his experiments and public demonstrations were considered failures, but now, after a lapse of more than half a century, we understand the reason for the failures and the world realizes that to Horace Wells and his former partner and pupil in dentistry, Dr. Wm. T. G. Morton, who was the first to give a public demonstration of the use of ether for surgical anesthesia in the General Hospital of Massachusetts in October, 1846, the world owes an everlasting debt of gratitude. While there is no doubt that Dr. Crawford W. Long, a country doctor in Jackson County, Georgia, administered ether two years prior to either Wells or Morton and for the distinct purpose of producing unconsciousness to pain, yet he was not so enterprising as the two last-named gentlemen, and took no steps to enlighten and benefit the world. However, the honor is sufficient for all three men, and America may well be proud of them.

In 1868 another American, Dr. Andrews, of Chicago, discovered that by mixing oxygen with nitrous oxid a non-asphyxial form of anesthesia could be produced.

NITROUS OXID

And right here is where I want you to begin to understand the difference between nitrous oxid anesthesia and nitrous oxid and oxygen anesthesia, because they are two distinctly different propositions. They are not synonymous terms and must not be so used. Pure nitrous oxid is a transparent, colorless gas with a pleasant sweetish odor and taste, and when inhaled pure without the admixture of atmospheric air or oxygen, produces a deep surgical anesthesia in from 40 to 60 seconds, signs of which are cyanosis with increasing lividity, muscular jactitation, stertorous breathing, and if administered to a lethel degree the respiration ceases and death is caused by asphyxia. Thus, you see, the patient fairly races through all the three stages or degrees of anesthesia with such rapidity that it is almost impossible to classify the phenomena of the different degrees and you will have, after you have reached the so-called third degree or stage, a surgical anesthesia lasting, on the average, from a minute to a minute and a half. During this time the surgeon may perform many short operations such as the opening of felons, abscesses, removal of adenoids, or the extraction of one or two teeth, during which time, the mask being removed from the face, the patient is fast recovering consciousness and the surgeon must cease his operations at the end of this short period of time. If not through with the operation, another dose of the gas must be given with the same phenomena as before, and so on to the end of the operation if it be one of any length, the patient being knocked out, as it were, by a series of blows administered by Sir Knight Asphyxia. While I do not mean to say that the patient is asphyxiated each time, I do mean that the anesthesia produced is poorly suited for surgical operations of any consequence.

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*Read before the West Virginia State Dental Society, 1913.

NITROUS OXID AND ATMOSPHERIC AIR

Now before taking up nitrous oxid and oxygen anesthesia, let us consider briefly nitrous oxid mixed with atmospheric air, one with which the writer has had experience. Let us suppose the patient prepared and in the operating room with the nitrous oxid apparatus standing ready and the atmospheric air, of course, in the operating room, with what other impurities it may contain.

One hundred per cent., of course, equals the anesthetic mixture of air and nitrous oxid the patient will receive into the lungs. Let us suppose we begin the anesthesia with sixty per cent. of nitrous oxid and forty per cent. of air; thirty-two parts of the atmospheric air, as you know, would be nitrogen and eight parts oxygen because the atmospheric air is composed of four parts of nitrogen to one of oxygen. The eight per cent. of oxygen contained in the mixture would be a sufficient amount to prevent cyanosis, but the sixty per cent. of nitrous oxid would not be sufficient to produce a profound and peaceful anesthesia free from muscular spasm. Now let us change the mixture and make it as follows: Let eighty per cent. equal the amount of nitrous oxid used, and twenty per cent. equal the air, of which sixteen parts is nitrogen and only four parts oxygen. In this case you would have too small an amount of oxygen to prevent cyanosis, and possibly an insufficient amount of nitrous oxid to produce anesthesia, much, of course, depending upon the patient.

Now if in this hypothetical example the oxygenating had been done with pure oxygen instead of atmospheric air, the inert and useless nitrogen would have been eliminated and its place in the alveoli of the lungs would have been occupied by useful oxygen or nitrous oxid as the case might demand.

It can readily be seen that, although nitrogen is necessary to the welfare and happiness of mankind, yet in the presence of nitrous oxid and oxygen in the lungs it is a base interloper and only adds to the asphyxial character of the gas.

N_2O AND O

Now we come to the consideration of nitrous oxid and oxygen anesthesia, the last step in the development of nitrous oxid anesthesia. Even the administration of the mixture of these two gases has undergone different phases of development, as for instance the giving of definite mixtures of nitrous oxid and oxygen under increased atmospheric pressure as practiced by the eminent French physiologist, Paul Bert, but all these we will pass by for the consideration of nitrous oxid and oxygen at ordinary atmospheric pressure with varying proportions of oxygen.

In the manufacturing of nitrous oxid, ammonium nitrate is placed in an iron retort where it is decomposed by heat into N. O. (Nitrous Oxid) and water, the nitrous oxid passing through various wash bottles to take out all impurities into a large gasometer. From this it can be piped directly into the operating room, or drawn from the gasometer by pumps and condensed under high pressure into a liquid and stored in iron cylinders containing from one hundred to thirty-five hundred gallons of the gas in a condensed form. It is usually furnished by the manufacturers in dark blue or black cylinders. Oxygen is obtained from manganese dioxid or potassium chlorate, and is furnished in red cylinders. To be successful in the proper mixing and administration of these two gases, the first and most important thing, regardless of what kind of an apparatus you use, is to have a continuous and even flow of gas under a positive and known pressure. The next requisite is to use warm gases, as less time is consumed in inducing anesthesia, less gas used, and a safer and more tranquil anesthesia will be the result. Third, maintain the depth and character of the anesthesia by the amount of oxygen mixed with the nitrous oxid, and not by turning on and off the nitrous oxid.

These three principles rightly understood make possible prolonged anesthesia under nitrous oxid and oxygen—a thing, I grant you, much easier said than done—and I am convinced, after much experience, that it is the anesthetic above all other anesthetics for the professional anesthetist; and, that it will not come into general use until physicians and dentists give it the thoughtful and studious consideration it deserves. It is not the anesthetic for the tyro in this science.

PHYSIOLOGICAL ACTION

Two theories were early advanced as to how nitrous oxid produced anesthesia. The first taught that this state was brought about by the over-oxidation of the blood. This we now know to be wrong, because nitrous oxid is not broken up into its original elements when absorbed by the blood, but, on the contrary, when inhaled into the lungs and while being distributed throughout the lung cells where it is absorbed by the blood, then the lymph, it finally begins its elimination by way of the pulmonary blood-stream, and the respiratory apparatus is absolutely unchanged. It is inhaled as nitrous oxid and exhaled the same stable body. This we know to be true because it requires a much higher heat than the body-heat to decompose it into its original elements, and also because the expiratory products of different administrations have been analyzed and found unchanged. Thus you see the theory of hyperoxidation is clearly untenable. The other theory taught, the deoxidation of the blood, is a view even more dangerous than the first, if it is believed that asphyxia is necessary before anesthesia can be produced. But this oxygen starvation theory is not altogether wrong, for the very good reason that it is impossible to produce surgical anesthesia without some of the evidence of asphyxia.

Now, just how is anesthesia produced? The writer realizes that he must approach this phase of the question very carefully, for there are those who believe that nitrous oxid has a specific chemical effect, the same as chloroform or ether. But the fact that nitrous oxid anesthesia can be produced by the use of oxygen without any apparent or easily-discovered asphyxia does not prove that the resultant anesthesia is not produced by some alteration of the oxygenating processes in the human economy; in fact, the increasing or diminishing of the percentages of oxygen or air seems to the writer a very good evidence that the anesthesia produced is the result of an insufficiency of oxygen, or, in other words, an anoxemic condition of the blood and brain cells, and this produces anesthesia; in fact, in anesthesia the brain and nerve cells are put out of commission for the time being, because of an insufficient amount of oxygen to excite them into action.

I do not believe that any physico-chemical changes take place within the brain or nerve cells as a result of the inhalation of nitrous oxid; but it produces anesthesia by a deoxygenation process, beginning back in the pulmonary circulation, where, owing to the supply of oxygen being cut off, the venous blood of the pulmonary artery passes unchanged into the minute radicles of the pulmonary veins, but as the latter require oxygenated blood to stimulate them more or less, stagnation ensues, which results in a general anoxemic condition that may quickly develop into asphyxia unless much skill is used in the proper mixing of the gases and a much closer watch kept over the respiration and pulse than is necessary when using ether.

In robust subjects muscular relaxation is not so complete as with ether; in fact, at times it is almost impossible to gain relaxation with nitrous oxid and oxygen alone. The way out of such a difficulty is by the introduction of a small percentage of ether along with the N_2O and O, or, if that is not sufficient, subsitute an ether cone for from three to five minutes, when the N_2O and O anesthesia can again be resorted to and the operation carried to completion with N_2O and O anesthesia alone.

As to nausea—post-operative nausea following nitrous oxid and oxygen anesthesia very rarely occurs. Comparing nitrous oxid anesthesias with ether, nausea occurs in only about two per cent. of the cases, while in ether it is usually from fifty to sixty per cent. It must be remembered that all post-operative nausea is not caused by the anesthetic. It is sometimes due to the pre-anesthetic hypnotic of morphine, atropine or scopolomine, peritonitis, or the operative manipulations of the surgeon, especially if the operation is an abnormal one.

DISADVANTAGES AND ADVANTAGES

First, it is more expensive than chloroform or ether.

Second, it requires skill, experience, close attention to detail, and a somewhat elaborate apparatus for its administration.

1st—Its low toxicity, compared with other anesthetic agents, being many times safer than ether, its limitations and safety depending much on the skill of the anesthetist.

2d—It may be administered warm. All anesthetic vapors are safer and more quickly absorbed when warm than cold. Dr. Gwathmey asserts that warm nitrous oxid and oxygen "is from three to five times as safe as cold gases."

3d—Bronchitis and pneumonia seldom follow the use of nitrous oxid.

This beneficent result is not due wholly to the temperature of the gas as some would have us believe, but rather to the fact that nitrous oxid produces no tissue changes.

These tissue changes caused by other anesthetics undoubtedly lower the resistance of the organism against the ever-present pneumococcus.

4th—Anesthesia is quickly induced and the gases are quickly eliminated, thereby insuring a speedier return of all the functions to the normal; for the shorter the induction period and the quicker the elimination, the better for all.

5th—Blood pressure is slightly raised during nitrous oxid and oxygen anesthesia.

6th—It causes no permanent effect of any significance in the blood.

7th—It does not cause nausea or vomiting.

8th—According to Dr. George W. Crile, of Cleveland: "It confers a high degree of immunity to shock. Under nitrous oxid and oxygen a patient will endure four times the amount of operative trauma as under ether. It protects the brain cells more than ether because it prevents the use of oxygen by the brain cells—an anoxemia of the brain cells."

"The chemical response of the brain cells is, of course, only possible in the presence of oxygen; therefore, in nitrous oxid anesthesia, there being a large reduction in the amount of oxygen available, the highly dischargeable substance of the brain cells is prevented from being so rapidly used up for want of oxygen. It is like turning on the fire extinguisher before the torch is applied."

With all of these most pronounced advantages in its favor I believe the day is not far distant when it will be the anesthetic of choice in nearly all surgical operations.

THE ELEVENTH ANNUAL DINNER OF THE ST. LOUIS SOCIETY OF DENTAL SCIENCE

The eleventh annual dinner of the St. Louis Society of Dental Science was held on Jan. 31st, 1914, at the Hotel Jefferson. All the pleasures and enthusiasm of the past dinners faded into oblivion as compared to this one. We give below some extracts from the toastmaster's remarks and some of the responses.

TOASTMASTER...*Dr. E. J. Lenzen*

My many friends: I am very happy to see you present at this, our Eleventh Annual Dinner, and sincerely hope that we will have many more such get-together parties.

I do not agree with the man who once said that "if you have one friend, consider yourself happy," nor do I believe many of us in the present day would be satisfied with the companionship or friendship of a single dog, suggested by the same man. Of all things that man loves and longs for most, there is nothing to compare with that of true friendship, the friendship that is enduring. We have come here to enjoy this friendship; to strengthen it, to bind it closer together. For at this meeting, as at former ones, we have first of all our dearest friends with us, the ladies, and as one of our speakers of last year said in his discourse on woman: "Without question the campfires on the mountain of our lives would be but dimly burning if we did not have the womanly smiles of our chaste Penelopes and our beautiful Helens to light them into cheerful blazes." Yes, we need those womanly smiles, and we need the woman, need her moral influence, need her virtuous presence, need her gentle graces and her refining power. God's first thought was Man. God's second thought was Woman. Second thoughts are always best, so here's to Woman. I take great pleasure in introducing the first speaker of the evening, Dr. E. P. Dameron, who will elaborate on God's second thought, Woman.

"WOMAN"..*Dr. E P. Dameron*

Dr. E. P. Dameron, responding to the toast "Woman" spoke as follows:

"WOMAN"

"After a heated argument at a very secret caucus the other night and by a very close vote, in which I voted for myself, I was unanimously selected to respond tonight to the toast 'Woman.' Not that I am yet a suffragette (I am not yet), but I reserve the right to change my mind in case my wife, her mother, my mother, and my three sisters should bring sufficient pressure to bear upon me, but mostly because I was afraid to leave this most important matter to the other fellows.

"When the opposition acknowledged defeat my friend Haverstick said: 'Now, Dameron, for Heaven's sake try to say something new, something different. Don't give us your same old set speech.' Haverstick, you know, is our 'Tango censor' and wants everything right up-to-date. As for myself, I believe in the good old-time established institutions, even to the point of subscribing to ye old-tyme epitaphs, like one recently discovered in England:

" 'Poor Martha Snell has gone away,
Her would if her could, but her couldn't stay,
She had two sore legs and a badish cough,
But it were her legs as carried her off.'

"This, however, is no occasion for epitaphs be they ever so enlightening—you all look entirely too happy for that—as happy in fact as the dentist who said: 'Madame, your teeth are in a very bad condition.' 'They must be,' she sighed, 'you look so happy.' But that is bordering upon business and this is not a business meeting—only sentiment is fitting for such an occasion. You know there is more in this world than money, and Bill said: 'I don't know, if there is my wife hasn't thought of it.' And there you are, for woman has thought and frequently expressed herself upon every topic of the day—always with credit to herself.

"I asked my wife if she would fix up something for me to say on this occasion and she said: 'My land! I haven't a dress fit to wear.' And there I was. I am an optimist and accepted this rebuff as an indication that the world is improving. Women do not, as a rule, miss such a golden opportunity to say something. A little boy said: 'Papa, did Edison make the first talking machine?' 'No, son, the Lord made the first talking machine, but Edison made the first one that could be shut off at will.' Now what do you think of that? Any man that could make a remark like that about the fair ones has a mind fit for treason, stratagem and spoils. I believe in a free country, free lunch and free speech, especially by my wife, and am willing to accord the same privilege to all 'ye fair ladyes.' If this be heresy, brothers, it's my treat. I'm like the beau whose sweetheart said: 'Do you think your love for me will endure?' 'Well, I've been through an awful lot in my time.'

"Experience, then, has convinced me that freedom of speech belongs to woman, but talk she ever so much 'her voice is the voice the stars had when they sang together.'

The 'philosopher,' Gabe Toots, said: 'Most of the trouble in this world wuz because about half the peepul in it wuz men and the other half wimmen.' But he didn't go so far as to say which half started the trouble, but I can guess which half settled it. Woman is the earth's peacemaker and the scripture says: 'Blessed be the peace-makers, for they shall inherit the earth'—or something like that.

"I've been a peaceable and peace-making citizen all my life and haven't so far inherited a thing—not even locomotor ataxia. But I am not a woman. In looking about for a sentiment that would measure up to my real thoughts on woman, I found two classics, one by our guest, Hon. Nick Perrin, from which our toastmaster quoted, the other by James A. Cooper: 'Woman the true source of all our joys; the mother, the sister, the wife, the true sympathetic friend: without her the first man would have found the Garden of Eden but a desert: for her kings have given up their thrones, generals have left their armies, and the course of empires has turned aside; when she ceases to exist the human race will no longer survive; she is to man "the rainbow in his storms of life, the evening beam that smiles the clouds away and tints the morrow with prophetic ray." '

"Now that's sound doctrine and those are my sentiments—the sentiments of all of us here—and if any here are not blessed with a woman, think of the rhyme:

" 'The woods are full of fairies,
The sea is full of fish;
But the thing I want is a woman—
And that's a manly wish.
We are thankful for woman's creation and—
'Till we are built like Angels—
With hammer, and chisel and pen,
We will work for ourselves, and a woman,
Forever and ever, Amen.' " —*Kipling.*

PIANO SOLO...*John Arthur*

READING (From Victor Hugo's *Les Miserables*) ....*Mrs. Edward E. Haverstick*

VIOLIN SOLO...*Dr. E. J. Lenzen*

TOASTMASTER:

"In the vicinity of St. Louis, just across the river, in Calhoun County, Ill., it is said, we have a resting place of a prehistoric race, also, that of such pre-historic animals as the Pterodacytl, Mastodon, Dinosaur, etc. It is known over there as Buzzard's Roost, but is really Perrin's Lodge. We have with us the Hon. J. Nick Perrin, of the above-mentioned lodge, and I know we will be delighted to listen to his beautiful language, high sentiments, and kind voice."

Hon. J. Nick Perrin responded to the toast, "When a Man Cuts His Wisdom Teeth."

TOASTMASTER:

"The man that hath no music in himself
Is fit for treasons, stratagems and spoils.

"When Beethoven, at the age of fifteen, journeyed to Vienna to pursue his studies, he played before the great Mozart, who, upon hearing him, exclaimed: 'Keep watch of this youngster, he will some day make a noise in the world.' "

PIANO SOLO..*Mrs. Val. H. Fredericks*

TOASTMASTER:

"Away with the flimsy idea that life with a past is attended;
There's now, only now, and no past, there's never a past—it has ended;
Away with the obsolete story, and all of its yesterday's sorrow;
There is only today, almost gone, and in front of today stands tomorrow."

Dr. R. C. Blackmer responds to the toast "To-day."

Responding to the toast, "To-day," Dr. R. C. Blackmer spoke as follows:

"TO DAY"

"MR. TOASTMASTER, LADIES AND GENTLEMEN:

"I rise, for the third time, to thank you for a very pleasant evening among you. When you invited me last year, for the second time, I felt that you must have an unusual friendly regard for me, and now that you have sent me the third bidding, to your annual feast, I am more than ever convinced of the fact. I assure you that it is a great pleasure for me to be with you. On the occasion of my first visit I spoke to you of 'Life,' last year I talked of 'Rest' and this evening I find that your Toastmaster has assigned me the subject 'To-day.' You are all doubtless familiar with Shakespeare's allusion to the Seven Ages of Man. Now, I think this subject might very appropriately have been given to the Lover, writing his sonnets to his Mistress' eyebrow, or to the Soldier seeking the bubble reputation at the cannon's mouth, but to hand it to the fifth age, the Justice with fair round stomach, with good capon lined, which last you have seen to with some considerable degree of thoroughness, is, to say the least, laughable. But so it is, and I must requite you with a few wise saws and modern instances.

"It seems to me that the age which I happen to represent, in my own person, is perhaps the most unsatisfactory that a poor human being can be compelled to endure, and I will tell you why. It is the age of inevitable defeat. Scientists tell us that primitive human society was divided into three groups: the first group was composed of one big, fierce, full-grown male; females, young and old, and very young males. The second group was composed of adolescent males, approaching maturity, and that the third group was not a group at all, but consisted of solitary old males. Now it would happen that when the big male of the first group arrived, as he did, in the course of time, to about this interesting age of which I speak, that he would inevitably cross lines with one of the lusty young males of the second group, a terrible fight would ensue, in which the big fellow would be beaten and driven out to live solitary and alone, while his triumphant and successful rival would bask amid the blushes of the aforementioned females, young and old, the admired of all the young fry and the observed of all observers. I cannot see where the situation of the solitary old male has been very much ameliorated since that date, so long, long ago. The battle may no longer be physical, but it is nevertheless real and severe, and the defeat is none the less humiliating. Though he is still permitted to dwell in the camp, his loneliness is none the less sorrowful. Mother still has a place of regard, influence, and sometimes of command in the family, but so far as I have been informed, there have been only two songs written about father, and one is, 'Everybody Works But Father,' and the other is, 'The Old Man Is Drunk Again.' Is it any wonder that his eyes are severe, that his brow wears a frown, that his talk has become cynical, and that his judgments of 'To-day' are at times somewhat unfair? His joy is clouded, as he finds his strength waning, his hold on things loosening, and his desires less and less considered by the rising generation, as he sinks down into the lean and slippered pantaloon.

"When he made his first great struggle into manhood he had everything to look forward to—his hope was high, the fire was in his blood, the world was with him, because he was cute and smart and fair to look upon, but in this last fight, he is alone, his blood is cold, and his hope is lost, in the absolute certainty of eventual defeat. I do not know of any age in more need of sympathy, nor less likely to receive it. His work is done, his place is wanted by younger men—men more in harmony with the spirit of 'To-day.' In former times, when change was less rapid, Nestor still had a place at the Council fire, for his opinion was sought and of value, but 'To-day' he finds himself cast out, a derelict on a stormy ocean, bereft of motive power, bereft of dignity in command, not considered fit even to teach his own grandchildren, and probably worthless, even as a Censor Morem. He sees the follies and weaknesses of the present generation, but has no power to call a halt. His warnings would go unheeded. His advice is unasked and unfollowed. His dreams are laughed at, his stories of former prowess unbelieved. In short, once he was *it*, now he is *nit*. What can 'To-day' ask of such as he? The good things of life are still high ideals, the moral and social virtues, great sacrifices, worldly wisdom, bodily health, physical comfort and the presence, around us, of those things which delight the senses. The bad things of life are still base ideals, the immoral and unsocial vices, selfishness, ignorance, disease, physical discomfort, and the deprivation of sensual delights. Yes, thank God, the great principles of morality and virtue are the same yesterday, to-day and forever.

"They were recognized before Abraham left Ur of the Chaldees, or even our Aryan ancestors chanted the Rig Veda on the plains of Iran. They have come down from the days of the fire mist, and will shine brighter than the halos in the New Jerusalem. There are men and women who seek these things 'To-day'—women who still regard virtue more than life, and men who prefer death to dishonor. Both men and women who still sacrifice everything, save virtue and honor, for the welfare of others—others who have no claim on them save that of common human brotherhood, and who cheerfully lay down their lives for the lives of others when occasion demands it. Even 'To-day' these are greater in number than most of us suspect.

> " 'As in the thronged and lighted ways,
> So in the dark and desert they stand,
> Wary and watchful all their days,
> That their Brethren's days may be long in the land.'

"Not so many people lack heart or courage or love of right as lack imagination and *esprit-de-corps*. There are thousands of rich men, millionaires, if you will, in this country 'To-day' like those who were on board the Titanic, who would scorn to take a place in the life boat so long as the poorest woman or child in the steerage was unprovided for, and yet these same men who went down to watery graves on that terrible day had carelessly allowed hundreds to perish by the lingering and suffering death of cold and starvation not two hundred yards from the palaces where they lolled in luxury. They required a calamity to shock them into a sense of responsibility and *noblesse oblige,* and when the calamity came they responded. Yet this was so of olden times, and I am not prepared to say that such people are fewer 'To-day' than in previous ages. We all have the spirit in us, but in some it is hidden more deeply beneath the cares and fardels of daily life. Neither do all have it in the same degree. In fact, it is given to but few to mount upon wings, like eagles—more can run and not be weary, but nearly all may walk along that road and not faint. We are not to look for the shining ones in the temples of fame, neither do their names appear frequently in the newspapers. It is not the Glennons nor the Phelans, but the Dempseys and the Dunnes who really illuminate the world, though they are not confined to any sect, trade, calling or profession, or to any special grade of society. Let us leave the field of morals and sacrifices and consider another phase of modern life. Never were there so many and so vast institutions of learning as 'To-day' and never was there such a large proportion of the products of human labor employed in the purpose of instruction. But while knowledge comes, wisdom often lingers. Learning, by itself, does not command a high price. Many a poor student has wasted his midnight oil only to find that learning was not a spade to dig with. Having been engaged in the work of education for twenty-two years, I may be pardoned for saying that, in my opinion, the prevailing notions in this country regarding education are all wrong. The unfortunate condition arises out of the distress we are put to in order to raise money to carry on our schools and universities, and the obligations we find ourselves under, in our dependence on donations. The result is, that instead of leading the thought of the country, our schools are compelled to follow and follow subserviently. The least expression of heresy to popular opinion may be sufficient to deprive a school of its support. In the old country the universities may be, and generally are, hot beds of radicalism, but here they have degenerated into mere feather beds, in which conservatism may die respectable. Here also we lack imagination. The nobility of study and investigation should naturally direct the thought of the world, and not the narrowness and self interest of the money power. We also miss the meaning of the word education. It is to draw out, and not to cram in. Here in this country we constantly increase the curriculum in the mistaken idea that it is the thing learned that is going to be of value to the student; nay, my friends, it is the strength of mind, gained in the process, rather. Again, never was there so much attention paid to bodily health as 'To-day.' This notion has indeed become a religion with some. Never were there so many sanitariums, so many hospitals, so many cures and health resorts, so many medical nostrums; and a person is hardly admitted to respectable society unless he or she has had three or more surgical operations; and yet the sun never looked down on such a vast army of chronic invalids. Great advancement has indeed been made in sanitation, but those missed by the epidemics are gathered in by mechanical accidents. There are more people killed and maimed 'To-day' by railroads and automobiles than formerly died from smallpox or the plague. I have no hesitation in expressing the belief that Hypocrates and Galen met the sanitary and mortal problems of their day as fearlessly and as successfully as have Leonard Wood and others the problems of 'To-day.' The physicians of 'To-day' have to contend with ignorance and superstition, as did Vessalius and Sylvius, for the cult of so-called Christian Science is a very faithful analogue to the witch exorcisms of the Middle Ages. Here again it is imagination we lack. We can never come to see ourselves as others see us, and so sin grievously against the real spirit of 'To-day.'

''Again, this is the age of physical comfort. Never since the world began was there such ease of communication, such facility of transportation, such evenness of temperature, such fineness of food, such softness of beds. such sybarite baths, for such as can afford them. Yet all these things bring very little content and happiness with them. Happiness abides in the heart of the individual, and is not, in any degree, dependent upon the abundance of things that individual possesses. The exigencies of fashion deprive as many of real comfort as do the strictures of poverty. The burden of society is as hard and irritating to bear as is manual labor. It is impossible that happiness should dwell with any individual who is swaying forever to and fro between the restlessness of avarice, and the thirst for delight, but it is frequently observed in the homes of those who labor hard and late in some congenial occupation.

''Again, take those things which minister to the delight of the senses, the great field of Art. Imagination is worse lacking here than anywhere else. Our artists in music, in painting, in sculpture, in architecture, in dress, are all slaves to copy, following the models of a more creative age, and the only way to get out of the rut is to leave the country and go to Paris or to some Italian city. Here we murder the creative outright, or permit it to die of starvation and frost. This has been called the age and country of invention. It is false, doubly false so far as Art goes. It is merely an age of Imitation that sticks on some addition that spoils the original design. And in my opinion, this fault is as conducive to bad morals as to bad taste. I will not touch upon the bad things further than to say that the worst tendency of all comes from the fact that instead of following in thought and opinion the results of study and investigation, our reformers are led by cranks and fads and self interests. Instead of trying to enlarge and preserve the great boon of individual liberty, they try to bring happiness by enthralling the people with innumerable laws, regulating private conduct. One thinks earth would be a paradise if strong drink could be abolished. Another thinks it all depends on Sunday observance. Another wants to lengthen the bed sheets. Another must have the beer inspected. Another goes for tobacco smoke; another for fly swatting; another for abolishing the Tango, and so it goes. Your American reformer always wants to suppress something or somebody; the name of our welfare exercises a worse tyranny than Pope, King or Nihilist.

'' 'God send us men the time like this demands—
Men with strong minds, brave hearts, true faith and willing hands.
Men that the lust of office does not kill—
Men that the spoils of office cannot buy—
Men who possess opinions and a Will—
Men who have honor, men who cannot lie.
Men who can stand before a demagogue
And damn his treacherous flatteries without winking—
Full men, sun-crowned who live above the fog
In public duty and in private thinking.
For while the rabble with its throat-worn creeds,
Its large professions and its little deeds
Mingle in selfish strife, Lo! Freedom weeps—
Wrong rules the land and waiting Justice sleeps.'

"I have long ago used up the time that should have been allotted to me and will close my remarks with the Old man's motto, one of the most hopeful little poems I ever read:

"'When wafted on by fortune's breeze,
Through endless peace, thou seemst to glide,
Prepare betimes for rougher seas,
And check the boast of foolish pride,
For though passing joy be thine "To-day."
Remember, this will pass away.

When all thy sky is draped in black
And beaten by tempestuous gales,
Thy shuddering ship seems all awrack,
Then trim again thy tattered sails;
To grim despair be not a prey—
Remember, this will pass away.

And so, my friends, be not o'er proud,
Nor yet cast down, judge thou aright,
When shines the sun, expect the cloud,
But in darkness, wait the coming light,
Whatever be thy lot "To-day"—
Remember, this will pass away.'"

THE NATIONAL DENTAL ASSOCIATION

SUCCESSFUL MEETING AT ROCHESTER. N. Y.—FAIR ATTENDANCE AND FINE PROGRAM—NEW OFFICERS ELECTED

A newsy synopsis of the proceedings of the National Dental Association which convened at Rochester, N. Y., July 7th, will be printed in early issues of THE DENTAL SUMMARY. However, in accordance with the policy of this magazine—to give to its readers all worth-while dental news while it is news—a brief outline of important features is presented below.

Attendance, about 4,000.

Mayor Edgerton and Secretary Woodward of the Chamber of Commerce welcomed the delegates, of whom there were nearly 4,000, and Dr. B. Holly Smith, of Baltimore, responded.

Two sessions were held Tuesday, the first day. At the first Henry A. Kelly, of Portland, Me., presided. At the second, Charles R. Turner, of Philadelphia, was chairman. The two general subjects under discussion were "Operative Dentistry, Nomenclature, Literature, Dental Education and Allied Subjects" and "Prosthodontia, Orthodontia, Metallurgy, Chemistry and Allied Subjects." Speakers were E. J. Eisen, Milwaukee; M. L. Rhein, New York; R. Ottolengui, New York; Elmer S. Best, Minneapolis; Herbert L. Wheeler, New York; S. E. Davenport, New York; J. O. McCall, Buffalo; A. P. Lee, Philadelphia; Dayton Dunbar Campbell, Kansas City, Mo.; J. F. Stephen, Cleveland; P. T. Dashwood, Atlanta; Charles A. Hawley, Washington; Alden J. Bush, Columbus, O.; Hart J. Goslee, Chicago; Thomas P. Hinman, Atlanta, and William O. Hulick, Cincinnati.

In the evening a symposium on Research work was conducted by Drs. Thomas B. Hartzell, Russell W. Bunting, G. V. Black, Frederick B. Noyes, Weston A. Price and Clarence J. Grieves. With slides and by other means the work of the Research commission was given to the dentists for the first time.

Present instruction received in dental colleges today was declared inadequate by President Homer C. Brown in his annual address.

''Instruction received in most of our dental colleges in histology, pathology and bacteriology is so meager,'' he said, ''that the present graduate is not sufficiently versed to consider it a preparatory course which would admit to more advanced work. We will, with more or less humiliation, admit that few of our practitioners of today are sufficiently educated in these particulars to reflect credit upon the profession. The preliminary educational requirements for matriculations should be advanced and there is no better way to accomplish this than to have specific requirements incorporated into our various State dental laws.''

President Brown made the following recommendations:

Approval of the purposes of the American school hygiene association.

Plans for a dental journal.

Increase in educational standards.

Disapproval of Low dental patents.

Legislative committee to be within easy reach of Washington.

Army and navy dental legislation.

Telegram to Senator Pomerene regarding the disadvantage to which dentists will be put if they are not excluded from certain anti-drug legislation pending in certain states.

Among noted physicians at the convention were Dr. Victor C. Vaughan, of Ann Arbor; Joseph Cole Bloodgood, of Baltimore, a Johns Hopkins University professor whose word on cancer is considered final, and Grover W. Wende, of Buffalo, president of the New York Medical Association.

The House of Delegates elected the following officers:

President, Don M. Gallie, Chicago; first vice president, Edward G. Link. Rochester; second vice president, L. P. Dotterer, Charleston, S. C.; third vice president, D. E. Turner, St. Louis; general secretary, Otto U. King, Huntington, Ind., re-elected; treasurer, H. B. McFadden, Philadelphia, re-elected; board of trustees, Waldo E. Boardman, Boston; Harvey J. Burkhart, Batavia, N. Y.; Clarence J. Grieves, Baltimore; Thomas P. Hinman, Atlanta; Marcus L. Ward, Ann Arbor; J. P. Buckley, Chicago; Thomas B. Hartzell, Minneapolis; C. T. White, Oklahoma City; S. W. Wherry, Ogden, Utah.

Dr. Harvey W. Wiley was chosen president of the National Mouth Hygiene Association at its concluding session. The association authorized the appointment of a commission to revise the regulations of the society, making it a ''corporation not for profit,'' under the laws of the United States in the District of Columbia and in the State of Ohio.

ANOTHER NEW DEPARTMENT

Beginning with this issue, a new department devoted to the better understanding of Ascher's New Enamel, methods of using, and clinical results, will be opened in THE DENTAL SUMMARY.

Dentists are requested to write papers for this section, with the object of improving professional and scientific knowledge, so that each individual may have the benefit of the general experience of the profession, exactly the same as with all other dental materials.

To profit by others' experience, we must know definitely what subject is being discussed, and it is not and never has been proper to limit mention or discussion to the *silicate type of cement*, instead of giving the *individual* *name* of the silicate that was used, about which technic, facts or clinical experience was given.

Questions and answers, and comments upon articles appearing in the section, are invited. Any article written upon the general silicate question will appear as usual in the regular section of the journal.

At present it is quite certain that very few, if any, dentists possess either the knowledge or skill in using Ascher's New Enamel to which they are entitled from the profession's ten years' experience.

CONFIDENCE IN SILICATE WORK

BY CHARLES M. BALDWIN, D.D.S.

Success comes from having sufficient confidence to attempt and carry through to completion.

The best success follows the most thorough training or preparation.

All professions recognize this as being necessary, and in proportion as this foundation is properly and consistently worked out, will one be able to intelligently use opportunities.

Modern dentistry has so developed and broadened, that special new fields have gradually been added, so that many successful dentists have been bewildered in attempting to include these operations in daily practice.

Just as preparation is necessary to enable them to successfully practice their profession generally, will they be required to prepare themselves for the new special fields, in proportion as such operations differ from their previous experience and require knowledge, technic, skill, ability.

Confidence must include an intelligent belief in the value of the operation, and the materials and methods used.

Ten years' use of silicate cements has not developed the knowledge, confidence, skill or success generally to which the profession is justly entitled.

Comparison with such fields of operation as pyorrhea, prophylaxis, gold and porcelain inlays, crown and bridge work, and analgesia, shows a woeful lack of articles on this subject in our journals, of either clinical or scientific value.

To obtain reliable data for establishing a sound foundation upon which to build valuable knowledge and form a correct estimate of materials used, as well as to develop technic, it will be necessary to distinguish between the silicate cements, accurately reporting clinical evidence, and making all statements of values or relative values by giving correct name of the individual silicate cement that has been used.

How many have stopped to think of the difference between the introduction of silicate cements and inlays, or all of the newer fields in dentistry? Dentists of unusual ability developed the fields of inlays, crowns and bridges for years, gaining valuable knowledge of various operations, technic and instruments needed before inviting the profession generally to attempt the work. Continuously, ever since, these and other experts have cliniced and written upon the same subjects.

Another important factor should be kept in mind, and that is that none of these operations were based upon new materials of unknown value, but instead were only a different use of old materials of established worth, viz., gold and porcelain.

Silicate cements, on the contrary, were introduced by commercial firms; and within a short time many dentists were playing with them—without any real knowledge based upon clinical work. Such statements and claims as were given out were almost entirely from a commercial source, or from the laboratories where they were produced.

At the beginning, as a profession we had no experts with successful clinical records to save us from making mistakes..

Plastics have the well earned reputation of being abused, or misused. Unfortunately too, the silicates carried the name of "cement," thus linking them with temporary work and low fees, instead of something that we value, as porcelain, always associated with skillful work and good fees.

One may know positively that an operation has failed within a day, week, month or year, but successful work includes an adequate durability according to its class that nothing but time will thoroughly demonstrate.

It is not surprising that failures were reported during the early years, and as few or almost no writers wrote of their success, soon it was widely claimed that failures were caused by qualities inherent in the silicate cement used. Probably this was true of some silicates, as to this day nothing of the success side is known, as they disappeared with the evidence against them. Ascher's Artificial Enamel is an exception, and it has been improved radically within the last two years, and is now called Ascher's New Enamel.

While ten years' use of a given article should have greatly improved our knowledge of it, so far as publicity is concerned, very little is known of the successful use of 'A.A.E.,' although individual dentists have used it continuously for from five to ten years. The profession has formed its judgment too largely by reports of failures, without knowing about the successful results.

What would we think of any work if nothing but the failures were reported, and not even the proportion of failures was given? In no other phase of our work have we been guided so largely by those who claimed to have failed. This has been possible only because such writers claimed that the material was the cause of the failures.

It is true there have been a few exceptions, and one of the most important contributions will appear in THE DENTAL SUMMARY beginning in September number as re-printed from *The Dominion Dental Journal*, and gives the experience of C. C. Voelker, D.D.S., of Brooklyn, N. Y.

Regardless of what value we feel that the silicate fillings may have, there is a great need of a more thorough understanding of the entire subject. Could some Rip Van Winkle dentist be awakened from a ten- or fifteen-years' sleep, and be made to fully realize the extent to which silicate fillings have been and are being used, he would be so amazed, if not shocked, that no one would be able to convince him that he was neither sleeping nor dreaming.

Those thoroughly aware of the facts state that there are more silicate fillings being placed in the six anterior teeth than of any other class of fillings. This is so nearly if not absolutely correct, that it should show anyone the seriousness of considering the silicate filling in any other sense than of the greatest importance. A little reflection should convince anyone that any material that has so largely displaced gold and porcelain within the short period of ten years is worthy of our best thought, and should be studied as accurately as our ability will permit.

All operations which the profession performs successfully have been studied, clinics given, and the subject written about and discussed by those most successfully performing such operations, and this has gone on for many years and continues to go on after generations have used the same class of materials, and performed the same style of operations.

If we are to place the silicate class of fillings where they belong, compared with other materials, it will be necessary to follow the same persistent course of at least careful clinical study. The manufacturer's and scientific side is too intricate and complicated a chemical field for any but the most advanced chemical students to even consider seriously.

As dentists, we are wholly unprepared to advance the work chemically, but we should observe carefully the users' side, viz., find out all of their qualities and the best conditions for taking advantage of these qualities during their exhibition in bottles, on the slab, during the operation, and all subsequent conditions in the mouth.

PROCESS PATENTS AGAIN

When the Court of Appeals in the District of Columbia on February 23, 1913, decided unanimously that Taggart's patents were invalid we congratulated ourselves. Most of us then believed that this case would never be heard of again. We thought that Taggart had received his lesson and that he would realize the futility of forcing a process patent upon the dental profession.

It seems, however, that our felicitations were rather premature and the assumption as to what Taggart would do were entirely wrong. We were taking things for granted, but we really had no reason for it. Taggart never said so and I doubt if it ever even entered his mind to quit, for as a matter of fact just about three months after, on June 2d, the case of Taggart *vs.* Moll came to trial in the district court of northern Illinois, before Judge Landis.

Here fortune favored Taggart. The profession was still drunk with its last success and thought the whole thing a big joke. Patent litigation is expensive and Moll, being poor and unknown, neither had money of his own nor was he able to rally the support of others to his defense. Owing, therefore, to the lack of funds, the case was poorly defended; this his attorney afterwards admitted. The result, of course, then, was a decision against Moll, which meant that all of Taggart's patents are valid and everyone who made an inlay was infringing. Therefore, according to the law, Taggart had a right not only to prohibit the profession of this district to use his method, excepting on such terms as he may choose to offer, but also to recover all profits made by any dentists through the use of inlays from the date of his patents, December 3, 1907, and in the accounting before the master of chancery Taggart was given a judgment against Moll for about seven years' profit on infringement, amounting to $1,857.50. Not very long after this judgment was placed on record the dentists of Chicago received the appended letter. Just how many were sent out is not known, but I believe over one hundred, and the plan seems to have been to pick a man here and there rather than concentrate them in one locality, presumably with the idea of not raising too much of an uproar, which would be apt to crystallize in united action. Naturally, when a man took the letter up to his attorney the advice he received was to settle, since patent litigation is too expensive for any one man to undertake singlehanded. Several did pay up. Finally, however, the letter reached a few men of broader vision, men who were able to look ahead, who, therefore, realized the danger to the profession if a system of license upon manipulative skill should be allowed to establish itself as the result of a decision in a poorly contested case; moreover, when a higher court in another district had declared unanimously these process patents invalid. They realized the injury such a precedent would work upon the economic and scientific welfare of the dental profession of this country, for already, it is claimed, twenty-one process patents affecting dentistry have been filed in the Patent Office of Washington. These men succeeded in working up the local interest and the Dentists' Mutual Protective Alliance was organized with the object of resisting to the utmost all attempts to force process patents of doubtful validity upon the profession.

The forming of our organization was evidently not to the liking of either Taggart or his attorneys, for it immediately put a stop to the collecting of money for license and shattered the dream of easy money. Accordingly, they started suit against the officers and members of the organization. Then they applied for a blanket preliminary injunction which would mean that every present or future member of the Dentists' Mutual Protective Alliance should be enjoined from making cast inlays until the case is finally decided by the court and in order to make it effective the officers should file the membership list with the clerk of court. This was denied them through the efforts of our attorneys. But it shows, nevertheless, the temper with which the case is going to be fought. They want a pound of flesh and will give no quarter as Taggart has expressed himself on the floor of the Chicago Dental Society: "I am a business man now and I am going to get all there is in it." I don't blame him, only it is up to us also to be business men. Yes! and more than that, men of honor and backbone, not a bunch of mollycoddles who can be trampled upon by whomsoever pleases.

The battle will be fought out right here and with the proper support we ought to be able to defeat Taggart so decisively that he will be convinced of the hopelessness of his efforts. Incidentally, it will serve as a warning to others who may have any aspirations to follow in Taggart's footsteps, proving to them that they can make better use of their money than trying to force a process patent upon the Dental Profession.

Send us your fee or contribution, call it what you please. The amount is $10.00. Get your friends and neighbors to do the same. Every dentist in this country will be affected by the results.

M. D. K. Bremner, *President,*
The Dentists' Mutual Protective Alliance.

For information, address U. P. Cooly, D.D.S., 2052 Lane Ct., Chicago. Ill.

(Copy of Letter.)

June 4, 1914.

Dr. M. D. H. Bremner,
353 W. Division St., Chicago, Ill

Dear Sir:

We are informed by our client, Dr. W. H. Taggart, that you have been, and are at the present time, infringing his patents covering the making of patterns and molds for casting dental inlays, the apparatus used in making such molds, also the finished inlays whether made by you or by others for you. We now offer you a license to use Dr. Taggart's patents in your future practice and to release all claims for past infringement, for $150.00. This offer will be open, for your acceptance of the license, for five (5) days, and unless it has been accepted by the end of this period, suit will be started against you for the full amount of all profits received and an injunction restraining you from further use of the process for casting gold inlays.

For your information, we beg to say that on April 15, 1914, Judge Landis, in the final decrees in a similar case, allowed client $1,857.50 as profits, being 80 per cent. of the practitioner's gross receipts, as well as a perpetual injunction restraining further use of the process for casting gold inlays. For disobedience of this order by the defendant, Dr. Taggart was awarded an additional sum of $300.00.

Yours truly,
Dyrenforth, Lee, Chritton & Wiles.
Attorneys for Dr. W. H. Taggart.

The New Municipal Auditorium in the Civic Center of San Francisco, where the Panama Pacific Dental Congress will be held August 30th to September 9th, 1915. (See page 674.)

OBITUARY

Dr. George Edwin Hunt

THE ENTIRE dental world was inexpressibly shocked at the announcement of the sudden death on the morning of July 11, of Dr. George Edwin Hunt, of acute gastritis, at his home in Indianapolis, to which city he had but recently returned from attendance at the convention of the National Dental Association.

Dr. Hunt was a man's man, possessed of many qualities of mind and heart that will serve to keep his memory green with all who knew him. A man of untiring energy and immense executive ability and force, his place in his college, in his social and professional life, as editor of *Oral Hygiene* and in many other avenues of beneficent activity will be hard to fill.

Dr. Hunt was of national reputation as Secretary of the Indiana Dental College, 1896-1900, and its dean since 1900; as founder of the *Indiana Dental Journal*, and its editor, 1898-1900; and as a contributor to other publications; President Indiana State Dental Association, 1901; President Institute of Dental Pedagogics, 1902; Secretary National Faculties Association, 1906-13; editor *Desmos*, 1900-14, and editor *Oral Hygiene*, 1911-14. He also was a prominent member of Delta Sigma Delta fraternity and one of its Past Supreme Grand Masters.

He had been a Mason since 1885 and had attained the Scottish Rite degree. He was also a Shriner, and a member of the Delta Tau Delta college fraternity.

He served as Secretary of the Commercial Club from 1901 to 1903, was Secretary of the Indiana State Board of Commerce for two years and Secretary of the Board of Trustees of Indiana University. He helped in establishing the Technical Institute, he assisted in obtaining public bathhouses and was a member of the Citizens' League in 1902. Dr. Hunt was the son of Phineas G. C. Hunt, a well-known member of both the medical and dental professions. He was born April 29, 1864, in a house since demolished, at Oriental and East Washington streets, Indianapolis.

The blow fell suddenly. He was taken ill the evening before at midnight and at 2 o'clock his wife attended him. At 6 o'clock when she entered his room again she found him dead.

On June 23, 1908, Dr. Hunt married Mrs. Maria Foster Buchanan, who survives him. In addition to the widow he is survived by two sisters, Mrs. E. D. Kingsbury and Miss Lew Ellen Hunt, and a step-daughter, Miss Frances Buchanan.

The story of Dr. Hunt's life is that of a successful man, who gained the highest point in his chosen profession. He had, according to his relatives, written the story of his life, the story he wished used in case of death, but this is locked in a safe and the combination has not been learned.

Dr. Hunt had distinctive literary talent and was the author of numerous short stories which appeared in monthly publications, in addition to his work in professional publications.

Dr. Hunt was fond of yachting, automobiling and golf, in addition to many other sports, but his chief indoor recreation was said to have been the reading and writing of professional literature and fiction. He also took part in numerous amateur theatrical projects.

Dr. Hunt will be missed, greatly missed, in many lines of work, but in none, it seems to us, so greatly as in the great oral hygiene movement in which he was intensely interested, devoting many hours to talks and instruction to children, teachers, mothers' clubs, social settlement workers, etc. His work in this educational movement probably exceeded that of any other dentist in the middle west. His heart was in it, and nothing was too onerous for him to undertake and carry through to a successful finish.

We can most heartily echo the following paragraph, which will appear in *Oral Hygiene* for August:

"That his work will live after him is a foregone conclusion. That he has paved the way for carrying on the work to which he has dedicated the last and four best years of his life is certain. He has but reached the end of his division. The grade will be easier and the roadbed smoother for his successor."

New Municipal Auditorium

The Panama Pacific Dental Congress is particularly fortunate in having secured space for its meeting in the new Auditorium in San Francisco, as this building, which will be ready for occupancy in December next, will be one of the finest Auditoriums in the world. It covers an entire city block, and contains every modern convenience for the use of societies and conventions. Its main hall will seat 12,000 persons; 6,000 in the balcony and 6,000 on the floor. The latter space, 198 by 200 feet, will be occupied by the exhibits of dental and pharmaceutical goods, and some of the general sessions of the Congress will be held in the balcony, the exhibit hall being closed to visitors during these sessions.

OPENS AUG. 30TH, 1915

Besides this main hall, the Auditorium contains six halls with a seating capacity of about 1,200 each, and four with a seating capacity of about 500 each. Enough of this space will be at the disposal of the Congress to accommodate the Oral Hygiene and other educational exhibits, the clinics and meetings of the various sections, and space will also be provided for the special meetings of the societies which will meet here as a part of the Dental Congress.

The Auditorium is located in the center of San Francisco, within eight blocks of all the leading hotels, and may be reached from the Exposition grounds in about ten minutes by either one of two direct car lines. The cars on Market Street, the main street of the city, go direct to the Auditorium.

No Dental Congress ever held has had such good accommodations, and the fact must not be overlooked that all its sessions, clinics and exhibits will be held in one great building, easily accessible from every part of San Francisco.

Wyoming State Board of Dental Examiners

The Wyoming State Board of Dental Examiners will meet at Cheyenne, Wyo., in the Senate Chamber, on the 1st, 2d and 3d days of September, 1914.

The written examination consists of Anatomy, Physiology, Histology and Bacteriology, Chemistry and Metallurgy, Oral Surgery, Anaesthetics, Operative and Prosthetic Dentistry, Materia Medica and Therapeutics, Prophylactics and Orthodontia.

Applicants must present a full plaster model of upper and lower jaws with teeth, also one without teeth. Practical work will be required from all candidates taking the examination. The candidate is required to furnish his own operating instruments, dental engine, amalgam, gold, wax and modeling compound.

For further information and application blanks, address

PETER APPEL, JR., *Secretary,*
P. O. Box 643, Cheyenne, Wyo.

Office: Rooms 1, 2 and 3, Wyoming Fuel and Feed Building,
Corner 18th Street and Carey Avenue.

Northern Indiana Dental Society

VACATION — WEEK-END — GOOD TIME.

Good-fellowship Convention, Culver, Indiana (Lake Maxinkuckee), Friday and Saturday, August 28-29. The man who can attend this meeting and doesn't, certainly must have a grudge against himself.

Come along, fellows! The water's fine. O. A. VANKIRK, *Secretary,*
Kendallville, Ind.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXIV SEPTEMBER, 1914 No. 9

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The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
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The Southwestern Michigan Dental Society
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REGULAR CONTRIBUTIONS

ANATOMICAL ANTAGONIZATION

BY GEORGE H. WILSON, D.D.S., CLEVELAND, OHIO

ARTICULATOR IS A NAME applied to an apparatus of many designs. The name is a misnomer because it is taken from a misnamed operation. The term Articulator—articulation is from articulus, a joint. In anatomical nomenclature it is applied only to the joints of hard substances as bones and teeth. The joint may be movable or immovable; it may have or may not have intervening soft tissue, but the joint is a constant relationship; thus the phalanges of a finger articulate with each other, but neither the fingers of one hand nor the interlocking fingers of the hands are said to articulate. The teeth articulate only upon their approximal mesial and distal surfaces; they occlude (passive) and antagonize (active) upon their morsal surfaces.

The instrument may be called an articulator because of the joint connecting the two maxillary bows, but articulation should never be used when occlusion or antagonization is implied. The misuse of this name is one of the very bad habits of the majority of our profession.

What is meant by Anatomical Occlusion or Antagonization? It means that the artificial teeth are mounted in a manner compatible with the laws of Nature; but not necessarily and rarely are they a reproduction of Nature, for Nature rarely attains perfection in our conception of her ideals. Nature's laws are immutable and not violable with impunity, therefore, the prosthetist should, if he desire the best results, bring his artificial creation into compatibility with Nature.

There are three laws of Nature that an artificial denture shall not, with impunity, violate:

First—The law of resistance of a tissue to compression.

Second—The law of freedom of movement of a tissue.

Third—The law of direction of force.

As an artificial denture must compress the soft tissues upon which it rests, it follows as a logical sequence—that the larger the surface and better distributed the pressure the less irritation, and consequently, Nature will better tolerate the artificial appliance. However, an artificial denture riding upon a muscle is retarding the free movement of that organ, and, if the contracting power of the muscle is greater than the retaining power it must dislodge the denture; therefore, there is in each individual case a circumscribed surface upon which the artificial denture may rest securely, but beyond which it is insecure and a source of irritation. The base-plate outline and adaptation being secured, the third factor, the laws regulating force must be complied with. This consists of mounting the teeth in such a manner as best to meet opposing forces—antagonism—antagonization. Therefore, anatomical occlusion (closed teeth—passive), a better term is anatomical antagonization (opposition—active), reduced to its lowest denomination may be defined as: A factor in retention of artificial teeth. Important as is this factor it is only one of several factors equally important. It is founded upon anatomical knowledge, therefore, scientific; but it is pure mechanics. This scientific mechanical operation is a super-structure resting upon a substructure (base-plate), and it is dependent upon the secure or insecure foundation—impression. Therefore, a properly-taken impression is the foundation—the key to success. The substructure (base-plate) is next in importance, and if made from a tested impression is quite simple, but as few impressions taken are tested and perfection assured, the base-plate constitutes a very uncertain factor as a support for the super-structure—anatomical occlusion. Is it not evident that anatomical occlusion is of little practical value to the mechanical laboratory man? But it is of vast importance to the prosthetist, provided he has properly diagnosed the case, taken a suitable impression and made a correct base-plate. The mechanical man guesses the impression was well taken, or knows that it was not; he guesses the base-plate may be properly adapted, or is very certain it is not. Why should he not content himself with simple occlusion, for it is just as good a guess as is anatomical occlusion when based upon two previous guesses? This is no "slam" at the laboratory man; it is at the operator. It is designed to impress the operator with the fact that the impression is of the first importance, that the adaptation of the base-plate is of equal value, that the operator alone is responsible for these two essentials; and that occlusion must necessarily be a guess upon the part of the laboratory man, notwithstanding the work is set up with great pretensions upon a highly scientific and elaborate apparatus. The only assurance any man can have of the correctness of an anatomically-occluded denture is by trial in the mouth, and then only provided one is competent to make such a test. There is no dentist that should be so vitally interested in the study of anatomical occlusion as is the general practitioner, although he makes use of the commercial dental laboratory.

To more fully appreciate the relative importance of anatomical occlusion in the scheme of restoring lost dental organs it is well to classify the essential factors entering into such restoration:

CLASSIFICATION

- Factors
  - Anatomy
    - A thorough knowledge of the various hard and soft tissues of the mouth—their form, action and controllability.
  - Retention
    - Measurements
      - Impressions and casts.
      - Occlusion and contour models.
      - Movements of the mandible.
    - Physics
      - Molecular attraction.
      - Atmospheric pressure.
      - Leverage (i. e.) anatomical occlusion.
  - Esthetics
    - Color
    - Forms
    - Contour

Thus it is seen that anatomical occlusion is a control of the physical laws of leverage. As leverage is the most powerful force utilized by the prosthetist, it becomes of great importance. Anatomical occlusion, probably, has had and is having more profound study than any other phase of prosthetic dentistry, as evidenced by the inventive genius displayed since 1840, the date of the first so-called anatomical articulator. Nevertheless, one must not lose sight of that other great factor—Esthetics; for a part can never equal the whole, and the perfect artificial denture is the thing desired.

What constitutes the distinction between plain occlusion of the teeth and the designated anatomical occlusion? Plain occlusion consists of arranging the teeth in the normal relationship of their morsal surfaces. Anatomical occlusion is an addition to plain occlusion, and consists of placing the teeth in such a position as to create the so-called "three-point contact." Plain occlusion is Nature's perfection and should always be striven for in every mounting of artificial teeth. The three-point contact is rarely found in natural dentures and is entirely unnecessary. However, three-point contact is essential, and is perfection in antagonization of artificial teeth. Three-point contact is a name applied to the operation of arranging artificial teeth so that they balance in incisal and lateral occlusion as well as in normal (retruded) occlusion. It is the control of the laws of leverage, therefore essential to perfection in artificial dentures. As before expressed, anatomical occlusion is a factor only in retention of artificial dentures; viewed in its naked form, it seems a very simple thing, but it is not; the subject has been coexistent with dentistry as a profession and is still a profound subject for investigation. It is believed that all the movements of the mandible are now understood, also that instruments have been invented to reproduce them; but no one knows what the future may have in store for us. It is certainly true that the profession is being flooded with inventions designed to make perfect this operation. Most of them have merit, but as yet none have overcome all difficulties so that the operation is automatic. Judgment is always an essential factor even with the most highly developed instrument on the market.

These questions arise in our minds: Are these expensive and elaborate instruments necessary? Can perfect results be produced with them? Are all the instruments called anatomical equally good, and if not, which is the best? If a general answer were required to all these questions it would have to be NO. However, that would be a very unjust way of disposing of the subject, for it is probably true that the vast majority of the profession is not qualified to make use of the knowledge or the best instruments now obtainable. Undoubtedly the Gysi Adaptable instrument is the most scientific instrument yet produced for anatomically mounting artificial teeth, and it should be in the hands of every teacher of prosthetic dentistry; furthermore, every student of anatomical antagonization should master the working of the mandible as best demonstrated by this equipment. Having comprehended the functions of the mandible and how to control or provide for the various movements, a simpler and less expensive instrument will suffice. Therefore, we will confine our considerations to the Gysi and Snow instruments.

ANATOMY

A thorough knowledge of the structure and use of the hard and soft tissues composing the masticating apparatus is necessary to fully comprehend anatomical occlusion; however, a resume only can be given here and the reader is referred to Gray for a full exposition. The four bones entering into the upper jaw are the two maxillary and palatal, while the lower jaw has but one—the mandible. The upper jaw is the fixed or stationary base, while the mandible is a lever or swinging arm attached to the cranium by ligaments and muscles. The attached end of the mandible (either end) is called the condyle, the portion of the temporal bone into which it sets is called the glenoid fossa, and the anterior inclined curved plane of the fossa is spoken of as the eminentia articularis. The condyle is separated from the fossa by a cushion of ligamentous tissue, and the two (condyle and fossa) are united, in part, by a capsular ligament attached below the head of the condyle and at the periphery of the glenoid fossa. This forms a peculiar ball-and-socket joint. There is no fixed rotating center, the rotating center being entirely outside the joint. In a simple open and shut movement of the mouth the rotating center of the joint is back of and a little below the neck of the condyle. Dr. Snow has called attention to the fact that this rotation center is caused by the restraining action of the external lateral ligament; but has no part in the trituration of food, that is antagonization: also that it is active only when the central incisor teeth are one-fourth of an inch or more apart. The condyle instead of being spherical is an elongated flattened spheroid. Its long axis is approximately at right angles to the ramus of the mandible, but is doubly oblique, that is, it is slightly inward, downward and backward. Hence, with the lateral excursion of the incisors the rotating center must be a component of the open and shut, and incisal movements; while a lateral movement of the mandible must have for its rotation center a component of the three movements. To construct an instrument admitting the reproduction of all the rotating points formed in the gyrations of the mandible seems now to be complicated and impracticable. The Kerr articulator was an attempt at producing the anatomical rotation joint, while the Gysi Adaptable establishes an average rotating point variable in one direction only.

This third movement of the mandible (mandibular-lateral) was recently described by Mr. Norman G. Bennett, of England, and measured by Professor Gysi, of Switzerland.

These three movements of the mandible—open and shut, incisal-lateral, and mandibular-lateral—are the important factors in anatomical occlusion. The Gysi adaptable articulator with its three measuring instruments is a valuable aid in comprehending and demonstrating these movements and their importance. It is the only instrument upon which it is possible to approximately reproduce all three of these movements of the mandible. Even with this instrument the teeth mounted in wax should be tried in the mouth for final adjustment. There is a reason for this—all three measurements are made by use of an insecure base-plate resting upon the mandible, consequently are not absolutely dependable. It is true that an expert and painstaking scientist and operator like Professor Gysi will produce quite accurate results with these instruments, but it is hardly reasonable to expect satisfactory results by even the average operator to say nothing of those inexperienced in handling instruments of precision. Therefore, the justification of the former statement—the Gysi Adaptable for teachers and expert prosthetists, and a simple instrument for the mass of the profession. The writer wishes to advise against the use of the Gysi Simplex for teaching purposes or as a practical laboratory instrument. However, it is excellent for mounting exhibition cases, as it is suitably adjusted for Mr. Averageman and for him only. The Snow articulator and face-bow is advised for students and general office practice. However, the Snow articulator without the use of the face-bow is no better than an ordinary articulator. The most highly-developed articulator can be of no service for anatomical occlusion unless the casts and occlusion models are mounted by the aid of well-taken measurements.

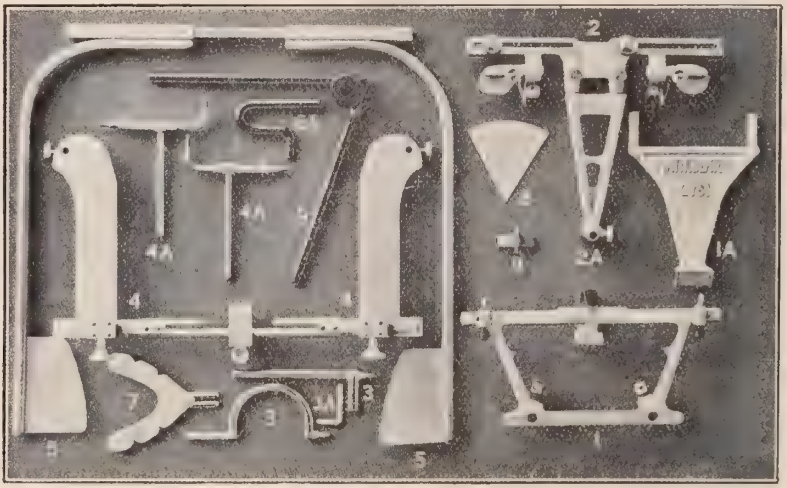


Fig. 1. The parts are as follows:

Nos. 1-2, upper and lower parts of articulator frame which carry the upper and lower model bows.
Nos. 1A and 2A, upper and lower model bows.
Nos. 3-3 Straight Incisor Guide Pin and Curved Incisor Guide Pin. The curved pin is used only when mounting models or setting anteriors.
No. 3A Small pin for all set screws.
Nos. 4-4 Framework of Condyle Path Register.
Nos. 4A-4A Pencil holders and pencils of Condyle Path Register.
Nos. 5-5 Lateral Path Register.
Nos. 6-6A Stand and gooseneck for holding Condyle Path Register and models.
No. 7 Horseshoe plate.
No. 8 Degree plate for measuring inclinations of paths.
No. 9 Incisor Path Register.

Therefore, the Snow articulator and face-bow, being simple and very practical, is advised with the admonition that the waxed trial denture must always be tried in the mouth for final adjustment. A well-developed anatomical articulator is desirable for the laboratory, but the perfection, the human anatomical articulator, is necessary for the operating room.

While balance, the so-called "three-point contact," is the essential and fundamental factor of anatomical occlusion it is dependent upon several other operative procedures. These associated factors can here be named only as each factor is a chapter by itself. They are: Impressions, Casts, Base-Plates, Occlusion and Contour Models, and Measurements. Anatomical occlusion emphasizes the importance of each of these factors, especially the base-plate and occlusion model. A base-plate of wax is very unsatisfactory for this work, a well-adapted resinoid base-plate is much better, but perfection requires a base-plate of vulcanite or metal. Having suitably-formed base-plates and occlusion models, and the meas-

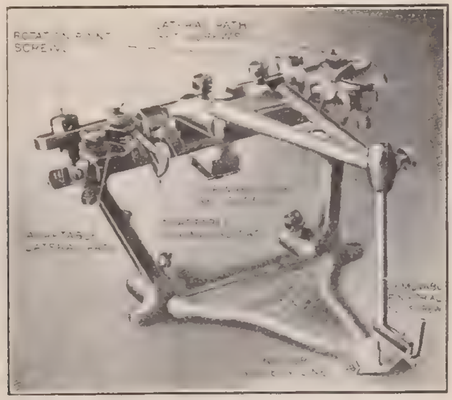


Fig. 2. The articulating frame without measuring instruments.

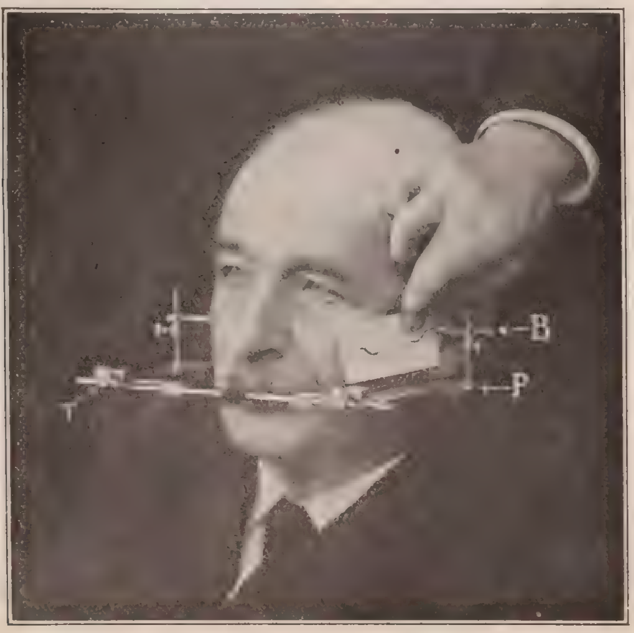


Fig. 3. The forward and downward movements of the condyles are recorded by the horizontal pencils of the Condyle Path Register. The ends of the pencils are placed opposite the condyle heads, a card is held against the face with its lower edge parallel with the broad plate of the Register, and the mandible is caused to exercise its different movements. The movements of one condyle at a time are thus recorded

urements obtained, the casts and occlusion models are mounted upon the articulator.

THE GYSI ADAPTABLE ARTICULATOR AND MEASURING INSTRUMENTS

Fig. 1 shows the parts of the adaptable articulator and the three measuring instruments in knockdown. Fig. 2 shows the articulator assembled and the important parts named. Figs. 3, 4 and 5 show and explain the use of the three measuring instruments better than a redundance of words.

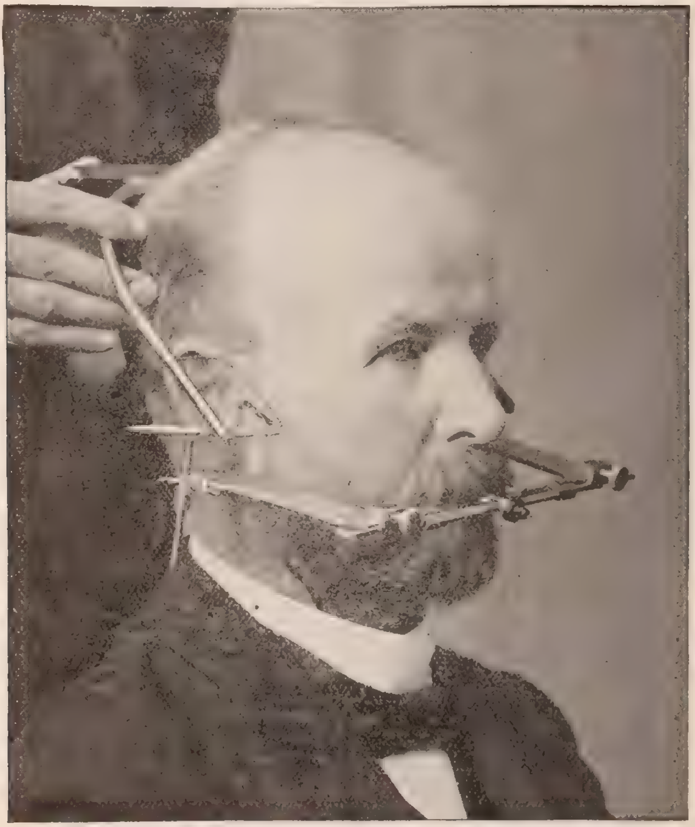


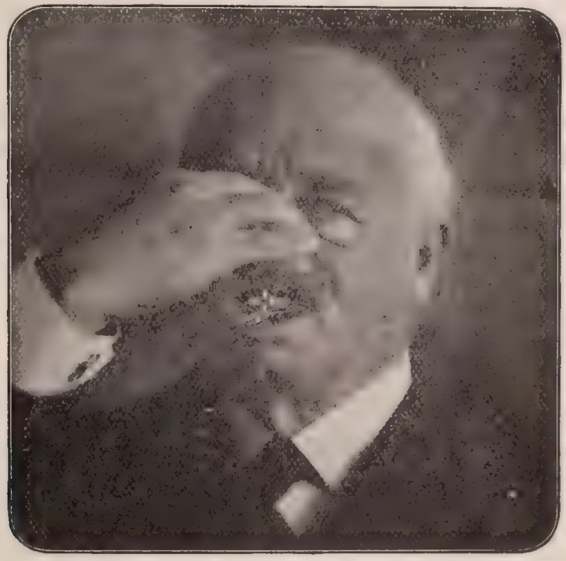
Fig. 4. Dr. Gysi with the Lateral Path Register held about his head. The vertical pencils have traced paths on the ground glass. The paths have been strengthened that they may be more easily seen.

Fig. 6 shows and explains the use of the stand, gooseneck and condyle path register for holding the casts and wax models in their position in the articulator ready for attaching the upper bow with plaster. The luting plaster having set, the condyle path register, gooseneck and stand are removed, and with the articulator turned upside down the lower bow is fastened with plaster.

The articulator is now to be set in accord with the measurements obtained with the three measuring instruments. The technic of these procedures is clearly elaborated in the pamphlet of instruction accompanying each apparatus, and to detail them here would not comport with the intent of this chapter.

OCCLUSION OF THE TEETH

Plain occlusion consists of the labial and buccal surfaces of the upper teeth slightly overlapping the same surfaces of the lower teeth. The morsal surfaces of the bicuspids and molars interlock one against two, except the upper third molar, and the six anterior upper teeth overlap the lower teeth (approximately) one-third of their length; but are not necessarily quite in contact with the lower ones. In normal occlusion the lower teeth, except the central incisors, are in advance of their corresponding upper teeth. These relationships are seen in the reproduced skulls in Figs. 7 and 8, also in the artificial dentures, Fig. 9. Plain occlusion lays no stress upon the long axis of the teeth, but the long axis is the controlling factor in anatomical occlusion; the factor that controls the direction of force in the various gyrations of the mandible. The two physical laws of force controlling leverage in antagonization of the teeth are: *First,* force moves in a straight line, and at right angles to the surface of its origin; and *second,* the combined direction of two or more forces is their resultant. Therefore, stability of a denture requires that the long axes of the teeth shall be at right angles to the plane of the jaws; also that the resultant of the incline planes of the morsal surfaces of the molars and bicuspids must be at right angles to the base plane. It is apparent that when an artificial denture has one cusp only in occlusion with the opposing denture, it is difficult to have the long axis of the tooth



(From *The Dental Cosmos*)

Fig. 5. The Incisor Path Guide registering on the blackened area of the Horseshoe Plate. The Guide must be mounted high enough above the plate so that the pattern can be clearly seen.

as the resultant of all the lines of force that may bear upon it. Hence, an auxiliary support may be had by so mounting the teeth that necessarily there is a second point of contact upon the opposite side of the denture; and still better if there can be three equilateral points of contact. This is the basis of the so-called "three-point contact" and is exemplified in incisal occlusions, (Fig. 10) and also in lateral mandibular occlusion, (Fig. 11).

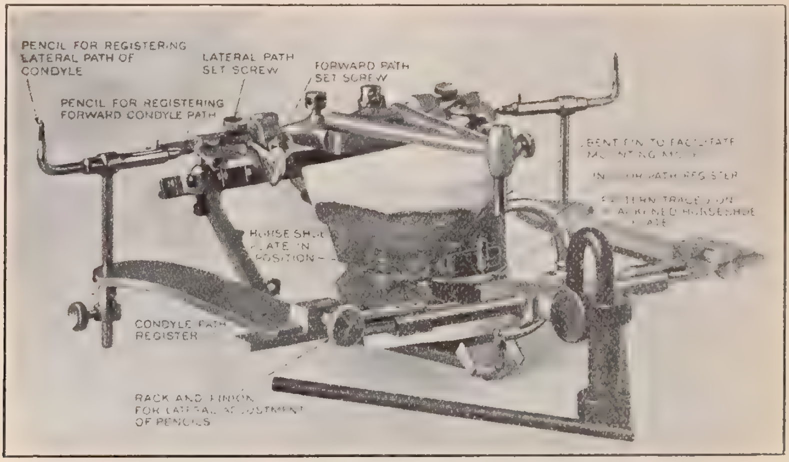

PENCIL FOR REGISTERING LATERAL PATH OF CONDYLE
LATERAL PATH SET SCREW
FORWARD PATH SET SCREW
PENCIL FOR REGISTERING FORWARD CONDYLE PATH
BENT PIN TO FACILITATE MOUNTING MODEL
INCISOR PATH REGISTER
PATTERN TRACED ON BLACKENED HORSESHOE PLATE
HORSE SHOE PLATE IN POSITION
CONDYLE PATH REGISTER
RACK AND PINION FOR LATERAL ADJUSTMENT OF PENCILS

Fig. 6. Mounting the trial plates and models by means of The Condyle Path Register, and the bent Incisor Guide Pin.

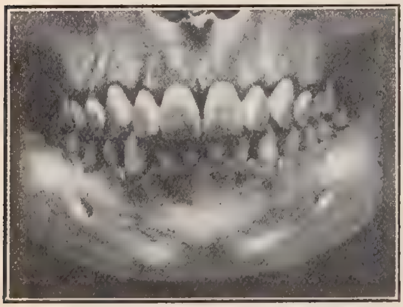


Fig. 7

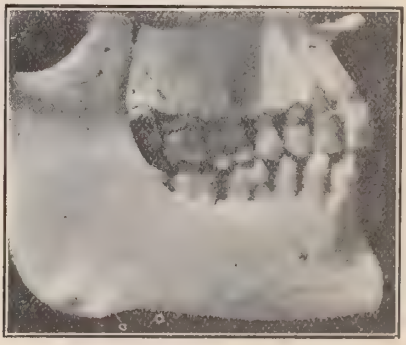


Fig. 8

ARRANGING THE TEETH

The six upper anterior teeth are mounted to the Bonwill dental circle with such variations as may be required for esthetics. The mounting of the bicuspids and molars should be considered as mechanical problems, and esthetics ignored just to the extent that the esthetic defects are not too glaring. The upper bicuspids and first molars, on either side, are arranged in a diverging straight line. Their long axes diverge slightly outward so as to have full face occlusion with the lower opposing teeth which converge inward as seen in Figs. 7, 8 and 9. This will provide for the lateral mandibular three-point contact (Fig. 11) provided the occlusal surfaces are properly formed and the long axes are correctly aligned; but it will not produce the incisal three-point contact, which must be secured by setting the lower second molar and the overlap of the central incisor in harmony with the inclination of the eminentia articularis. It is seen in Figs. 7 and 8 that the upper incisors overlap the lower incisors one-third of their length; this permits the lower second molars, when moved forward, to occlude with the upper first molars provided the condyle path is horizontal. If the condyle path is very oblique and there is a typical one-third incisal overbite, the lower second molar (either side) would have to be set at an impracticable inclination; whereas, by placing the overbite at the minimum, the inclination of the second molar may be reduced.

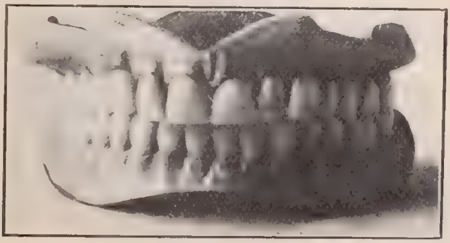


Fig. 9

There are two methods by which the incisal three-point contact may be produced. The one method has just been described and consists of placing the lower second molar in harmonious relation with the eminentia articularis, the upper first molar and the central incisor. This method is necessary when using the older forms of artificial teeth. The second method consists of having molars with long lingual cusps, which are characteristic of the best of the newer forms of molars. The long lingual cusps of the upper molars and the deep sulci of the lower molars compensate for the oblique condyle path and make unnecessary the anterior obliquing of the long axis of the second molar, thereby adding to the effectiveness of the masticating surface of the second molars. In fact if the lower second molar is placed in a very antero-oblique position the stability of the dentures is enhanced by leaving off the upper second molar.

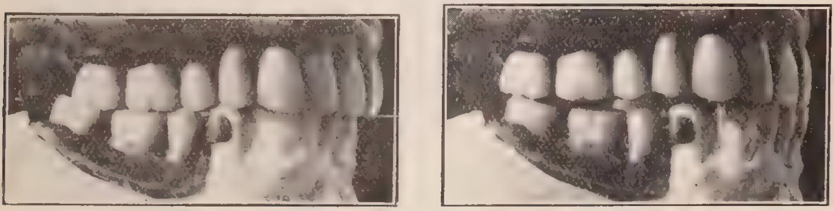


Fig. 10

Professor Gysi instructs to set the upper bicuspids and molars directly over the crest of the alveolar ridge, with the lingual cusp of the first bicuspid slightly above the horizontal plane of the buccal cusp; the two cusps of the second bicuspid are in their same horizontal plane, while the lingual cusps of the molars are increasingly below the horizontal plane of their buccal cusps. He instructs to set the molars so as to slightly open the bite and then force into occlusion by placing the teeth repeatedly in right and left lateral mandibular occlusion. This is a very simple and effectual technic for securing the lateral mandibular three-point contact. This is normal occlusion, or, normal bite.

CROSS-BITE

When there is an excessive disparity between the width of the upper and lower alveolar processes better results may often be obtained by the cross-bite method. This consists of exchanging places with the molars and second bicuspids criss-cross, that is, the upper right teeth exchange places with the left lower and the upper left with the right lower. This interchange of position necessitates some grinding. In time, cross-bite teeth of Professor Gysi's patterns will be on the market. This cross-bite method of mounting places the buccal surface of the lower molars buccally to the buccal surface of the upper molars, thereby placing the teeth in better relation to the alveolar ridges and interfering less with the movements of the tongue. However, in excessively resorbed ridges this cross-bite is rarely required because the base-plane is at the periphery of the base-plate rather than at the crest of the alveolar ridges, and the normal bite is preferable.

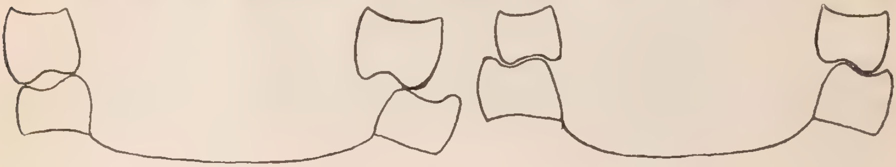


Fig. 11

TRIAL OF THE TEETH ON THE HUMAN ANATOMICAL ARTICULATOR

If well adapted base-plates, occlusion models and measurements were obtained, and reasonable care given to mounting the teeth anatomically, the wax being thoroughly chilled, the dentures are ready for proving in the mouth. Patients should be instructed that the teeth are mounted in wax and that they must not use force upon them unless they are instructed to do so. The teeth are placed in the mouth in normal occlusion, and studied esthetically, then they are placed in incisal occlusion, and, with a thin blade spatula, tested to see that there is equal pressure at the three points of contact. They are then placed consecutively in right and left lateral occlusion, and tested in like manner. Should any of the teeth prove to be too prominent the wax about the elongated teeth is slightly warmed, replaced in the mouth and the teeth closed in the necessary occlusions to adjust them. Should any of the teeth be too short, the wax is dried, the teeth raised and waxed, then adjusted in the mouth.

The anatomically occluded teeth may now be considered perfect, and ready for mounting on vulcanite.

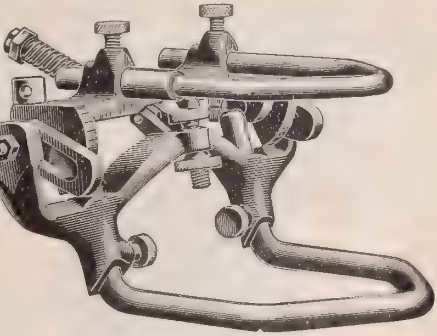


Fig. 12

THE SNOW ARTICULATOR AND FACE-BOW

Fig. 12 is the new Century articulator. This instrument is built upon the lines of the Gritman. The frame is higher arched and more open at the back than its predecessor. It has each bow secured with two set screws; also an extra pair of bows, the upper bayonet shaped and the lower having longer standards. Therefore, the instrument is adjustable to any thickness of casts and models. The condyle path is represented by a straight slot which can be set at any desired angle.

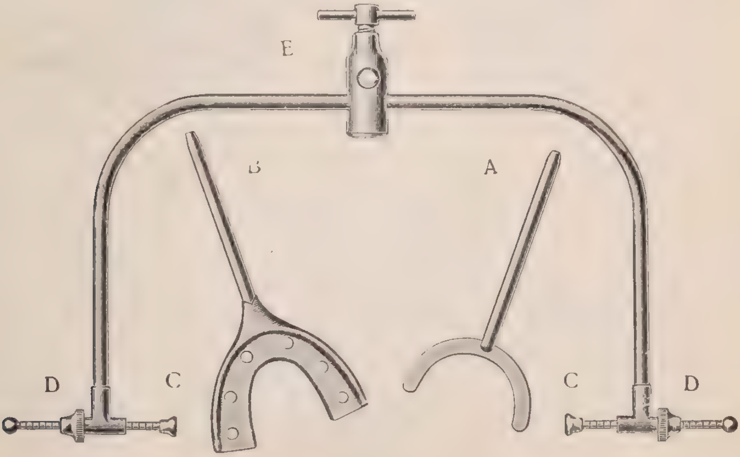


Fig. 13

Fig. 13 shows the Snow face-bow. *A* is the fork for attaching to the upper wax model as seen in Fig. 15. *B* is an extra fork that may be used for special purposes, but unnecessary for regular work. *CC* are the condyle arms, and *DD* set screws. The center of the bow shows a universal clamp for securely holding the fork mounted with the wax models.

Fig. 14 illustrates the method of using the face-bow. The head of the condyle bar is located over the tubercle of the condyle, which is just under the zygomatic process and in a line drawn from the center of the tragus of the ear to the outer canthus of the eye. It is usually one-fourth to one-half of an inch, or about one centimeter, in front of the tragus of the ear. The face-bow must be adjusted so that the condyle bars have an equal protrusion inward when in contact with the skin. As the condyle bars can be adjusted only by having freedom of movement of bow, fork and universal clamp, they necessarily must be automatically adjusted and making tight the universal set-screw completes the operation. The set screw must be made secure, and at no time can the relationship of the bow and fork be changed with impunity. The condyle bars may be moved outward free of the face, this relationship being no longer material. The wax models attached to the fork are removed from the mouth, dried and securely attached to the plaster casts. The condyle bars are pressed inward to their limit and clamped. They are then sprung over the nibs representing the heads of the condyles, and the lower bow moved upward or downward until it supports the lower cast in such a position that the occlusal plane of the wax models is parallel with the lower bow. The two set screws of the lower bow are made fast, the upper bow, either straight or bayonet, is adjusted free of the upper cast, and both bows secured with plaster. (Fig. 15.) The face-bow and fork are now removed.

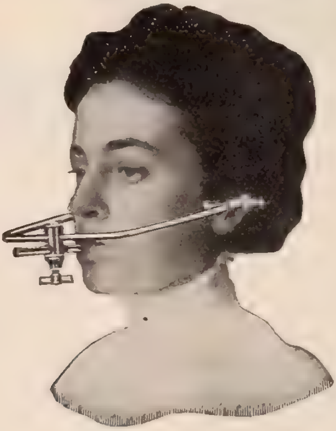


Fig. 14

What has the face-bow done? It has established the Bonwill equilateral triangle for the individual case, and mounted the casts in their exact relationship to the tubercles of the condyles.

The condyle path is now obtained by placing the occlusion models in the mouth, and training the patient to move the mandible forward and backward at command. When the patient is proficient in this movement the lower occlusion model is removed and the Snow "bite gauges" (Fig. 16) attached; when it is returned to the mouth, and the patient requested to close the mouth with the mandible in the forward position, until there is equal pressure upon the three points—incisal and the two-bite gauges. The occlusion models are returned to the articulator, the spring released, the two condyle-path set-screws loosened, when the articulator is closed to the forward measurement, and the condyle-path set-screws tightened. Removing the bite gauges and attaching the spring completes the mounting. (Fig. 17.)

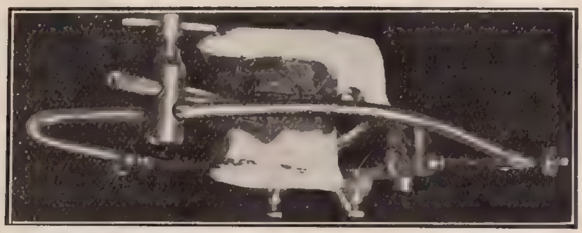


Fig. 15

Fig. 16

In place of the bite gauges the writer prefers wax as gauges. A small notch is made on the occlusal surfaces of each side of both occlusion models. A small mass of moderately soft wax is placed between the notched surfaces, the mandible closed in the protruded position, and equal pressure secured at the three points of contact.

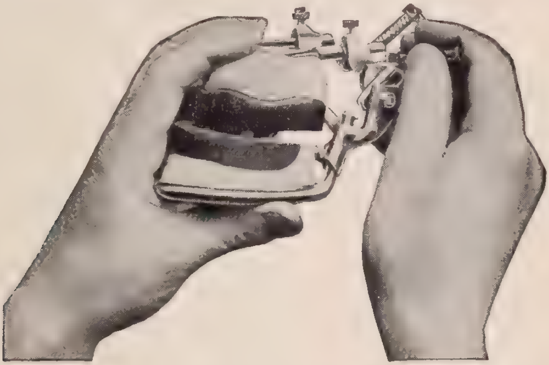


Fig. 17

The teeth are mounted as previously described. It is manifest that the teeth mounted upon this instrument have no provision made for the lateral mandibular movement, also has a fixed rotating center that is not anatomical, therefore, the absolute necessity for testing and possibly readjusting them on the human anatomical articulator. However, this is essential with all mechanical articulators.

As we cut and then file; as we carve and then polish—so should we cultivate ourselves.—*Confucius.*

Learning without thought is labor lost; thought without learning is perilous.—*Confucius.*

THE RELATION OF ARTIFICIAL DENTURES TO ARTICULATE SPEECH

A CONSIDERATION OF THE RUGAE AND ANATOMICAL PLATES AND COMBINATION OF THEM

BY I. J. DRESCH, TOLEDO, OHIO

AS THE READER IS DOUBTLESS AWARE, the first movement toward the production of articulate speech takes place in the larynx. Air being forced through a more or less confined space causes the vocal cords to vibrate, resulting in audible sound.

The vibrations or "sounds" thus originating are thrown against the distal edge of the hard palate, this action giving the individual tone or "color" to the vocal expression of each person, after which the volume of air in vibration passes into the oral cavity where it is transformed into words, "articulate speech," by various complex movements of the tongue.

A good example of these complex movements of the tongue is that necessary in the utterance of the letters T and D, the sounds of which are produced by the tongue making an upward and forward movement until the tip and sides are pressed closely to the alveolar border of the upper jaw, where it pauses for a brief fraction of a second before dropping into its normal position of rest.

This description is intended to define and illustrate the fact that movements of the tongue against the palate and teeth, by interrupting the flow of vibrating air from the larynx, causing it to escape from the mouth in disconnected impulses of varying lengths and intensity, are the mechanical causes which produce articulate speech. This being the case, it follows that speech thus produced depends for its quality upon the relation existing between teeth, tongue and palate. Speech is perfect only to the degree that these parts of the vocal apparatus act in harmony with each other.

No two mouths are alike. Certain differences distinguish every mouth from every other mouth. Therefore, the environment of the tongue, the active factor in the mechanism of speech and its movements differ in each case. Every tongue has been so trained as to adapt itself to the peculiarities of its own particular environment.

These premises being admitted, as they necessarily must be, it follows by logical inference that, when the normal and harmonious relations of tongue, teeth and palate are broken or interfered with, the ability of the individual to articulate perfectly is more or less seriously impaired.

Especially is such impairment noticeably serious in every case in which an artificial denture has been substituted for the natural teeth, for the very evident and sufficient reason that the substitution does not adequately restore the natural environment and relation of tongue, palate, alveolar ridge and teeth, and the tongue is unable to accustom itself to the changed conditions which compel it to move within unusual surroundings, amounting to more or less serious restraint.

This impairment, and the restraint consequent upon it, are greatly accentuated by the uneven thickness of the palatal portion of the ordinary rubber denture, while the loss of the alveolar ridge and rugæ leaves the tongue without any of its customary landmarks or guides for determining the length or direction of the various complicated movements necessary to clear, well-defined speech.

Here, then, have been laid down the causes for the impaired speech so noticeable in wearers of artificial dentures. Is there a remedy? Every skillful mechanical dentist knows that there is such a remedy, but knowing and doing are never so far from being one as in the practice of prosthesis. Many a man lacks the manual dexterity to produce the results sought, as a matter of fact, only those who specialize on the mechanics of dentistry should be expected to acquire it.

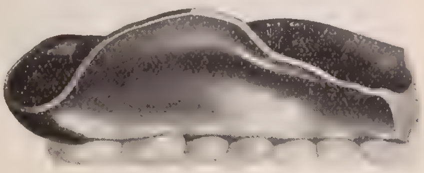


Fig. 1

To construct a denture so that perfect phonetic results shall be possible to the wearer, it is necessary that the palatal floor of the plate be extremely thin, so thin that the ordinary method of vulcanizing and polishing is impossible, of uniform thickness throughout, and that it shall be a perfect replica of the natural palate, with alveolar ridge properly worked out. As strength is necessary, no grinding or polishing can be done on such plates: they must be vulcanized against metal forms so that they come from the vulcanizer finished, ready for wear.

These plates are known as "Anatomical Plates" and are produced by a process known to some of the better laboratories. Fig. 1 shows a section of such a plate. Note the thinness of the excised edge and the perfection with which the alveolar ridge has been restored.

As no grinding or polishing is necessary to the finishing of these plates, all the natural strength and elasticity of the rubber is preserved. Anatomical plates may be dropped on the floor and otherwise mistreated without injury.

In cases in which normal rugæ are absent, or but poorly developed, it is necessary to add artificial rugæ, which will, after the plate has been worn for a short time, give valuable aid to the tongue in determining its proper position for correct and clear enunciation. A combination of the Anatomical Plate and Rugæ Plate, Fig. 2, is indicated in such cases.

So marked is the advantage to the wearer of these plates that only a knowledge of them would seem to be necessary to their general use. A perfect-fitting, anatomically articulated artificial denture, that not only does not impede speech but promotes it, is, of course, the ideal of every conscientious, progressive dentist; and experience has shown that in these two models, the Anatomical Plate, and the combination of Ply and Rugæ Plate, this ideal is, in large measure, realized.

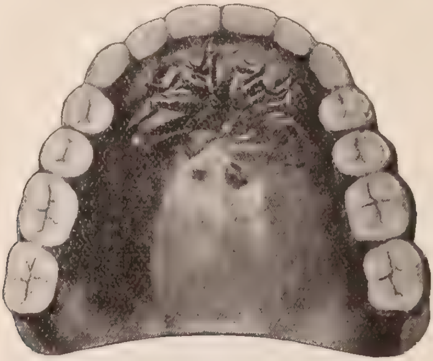


Fig. 2

CONDUCTIVE AND INFILTRATION LOCAL ANESTHESIA*

BY B. R. EAST, D.D.S., DETROIT, MICH.

THE DENTAL PROFESSION IS DOING more and better work than ever before, and to the patients' and operators' relief, with less suffering; in fact, we are all doing part of our work without any pain, and our goal is to do all dental operations without discomfort.

There are two methods of eliminating pain: By the use of local and general anesthetics. Even analgesia must be classified as a general anesthetic. Local anesthesia may be brought about by the following methods:

1. Conductive.
2. Infiltration.
3. Intraosseous.

By conductive anesthesia is meant the blocking of a nerve trunk away from the immediate field of operation. The infiltration method is simply placing local anesthetic in tissue in region of operation, allowing the liquid to infiltrate throughout. Intraosseous, forcing anesthetic through a small hole drilled in the body of bone.

I wish to try to interest you in the first two methods, Conductive and Infiltration Anesthesia, to eliminate pain from cavity preparation, pulp removal and oral surgery.

*Read before the First District Dental Society of Michigan at Detroit, May 14, 1914.

The success of local anesthetics depends entirely upon the proper technic and a knowledge of the osteology and nervous anatomy of the parts to be operated on.

CONDUCTIVE ANESTHESIA OF MANDIBLE

Conductive anesthesia is particularly adapted for use in the mandible. The teeth of the lower jaw are supplied with the sense of touch through the mandibular division of the fifth or trifacial nerve. This nerve communicates with the inferior teeth by passing through the inferior dental canal which runs inside the hard, non-porous body of mandible nearly to the median line. This physical condition of bone accounts for unsuccessful efforts to anesthetize any of the six inferior posterior teeth by infiltrating a local anesthetic in gum tissue around them.

The inferior dental nerve enters the inferior dental canal at the inferior foramen on the lingual side of the ramus. At this point a proper amount of a given local anesthetic will anesthetize the six posterior teeth in five to twenty minutes' time, the condition lasting from one to three hours, during which time cavities may be prepared, and pulps removed painlessly. At times when operating upon molars, anesthesia will not be complete, due to communication through the Buccinator nerve. A few drops of anesthetic placed in the buccal gum will overcome this. If anesthesia of bicuspids and cuspids is not complete after an injection into the pteryo-mandibular space, an injection into the mental foramen on *opposite* side is required. For anesthesia of all the inferior teeth, inject into each inferior dental foramen.

TECHNIC OF INJECTION INTO INFERIOR DENTAL FORAMEN

Wash or spray the mouth with an antiseptic, touch mucous membrane at point of needle's entrance with iodine. This point is just back and one-third inch above last molar. Place syringe over first bicuspid on opposite side of jaw and insert needle at point prepared until internal oblique line is felt, then follow bone as closely as possible until needle has been inserted nearly to hub (needle being 1⅝-inch Schimmel); at this point deposit two c.c. of a 2 per cent. solution. Where surgical anesthesia is desired, the following variation is observed, when needle is in half way to hub, deposit one-half c.c. of solution, blocking the lingual nerve.

TECHNIC OF MENTAL INJECTION

The mouth is prepared as before, needle inserted at muscle line below first bicuspid, going down and slightly back, depositing one c.c. of 2 per cent. solution.

When lip on side of pteryo-mandibular injection becomes anesthetized, it is safe to begin operating on teeth. Always caution children against biting lips, as they may injure tissue without pain to themselves after leaving office. The four inferior incisors may be anesthetized by infiltrating one c.c. of 2 per cent. solution near apex of tooth on the labial side.

The nerve supply of upper teeth is from the infraorbital nerve which gives off three branches—the posterior, middle and anterior dental. The three molars are supplied by the posterior branch and are easily accessible at the posterior alveolar foramina one and one-half inches above the last molar. One c.c. of 2 per cent. solution will usually bring a state of anesthesia in the three molars in ten minutes' time. The bicuspids are supplied by the middle dental, which can be reached at the infraorbital foramen, one c.c of a 2 per cent. solution, placed at this point one inch to one and one-half inches above the bicuspids, will anesthetize the bicuspids in ten minutes' time. However, infiltration in the maxilla is entirely successful.

INFILTRATION METHOD

Mouth is prepared as before: from one to 1½ c.c. of 2 per cent. solution is slowly injected around the buccal root or roots of tooth to be worked upon, and a small amount on the lingual. Anesthesia takes place in from 10 to 15 minutes' time. Centrals, laterals and cuspids may be anesthetized by one injection on labial, opposite apex of root.

For surgical operations in upper jaw an injection into the major and minor palatine foramina, which are above and slightly back of posterior molar, blocks the anterior, middle and posterior palatine nerves. A small amount of anesthetic should be used at this point, not over 5-6 minims, as the posterior palatine contains motor fibers from superficial petrosal ramifying not only with the mucous membrane, but also in the levator veli palatine and musc. uvulae. A too intense state of anesthesia will make deglutition difficult.

When the field of operation is near anterior of mouth an injection of one c.c. 2 per cent. solution into the incisal foramina should be used. These foramina are just back of central incisors.

The anesthetic used is a two per cent. solution of novocain, the tablet E, made by the Farbwerke-Hoechst Company, being favored by most operators. One tablet E contains .0.02 gram novocain and 0.00005 gram suprarenin. One tablet dissolved in one c.c. of a .06 per cent. solution of normal salt makes a 2 per cent. solution of novocain, and is perfectly isotonic.

The maximum dose of novocain has been found to be between three-quarters and one gram, or forty-five times one tablet E. I never have had occasion to use over five tablets, or one-tenth of the maximum dose. This solution should be boiled and cooled to blood temperature in test tube just before injection.

STERILIZATION

Use a Schimmel Sterilizer, keeping needle immersed in lysol and barrel partly filled. Ten minutes in lysol gives perfect sterilization.

I wish to present to you just one case: H. W., male, 25 years of age, mechanic. Pain throughout lower jaw. Examination discloses cavities in lower left third and second molars, pulp exposed in left cuspid, large cavity in left lateral, compound cavity in distal and occlusal surfaces of lower right first molar, also cervical in same tooth; lower right second molar completely broken down and pulp exposed.

Injected 2 per cent. solution novocain into each inferior dental foramina, also blocking each lingual nerve. After fifteen minutes' time removed pulp and filled canal of cuspid, prepared cavities in left first molar, cuspid, lateral and disto-occlusal and cervical cavities in right first molar, and filled with amalgam and cement. Extracted left third molar and right second molar. Sitting lasted two hours, and anesthesia remained two hours more. Patient said he suffered no pain, and returned to his work directly from office, and finished his usual day's work.

PLASTIC PORCELAIN*

BY J. T. NEWTON, D.D.S., CLEVELAND, OHIO.

THE SUBJECT GIVEN ME by your program committee has not been at our command long enough to formulate definite conclusions. During my time as a practitioner of dentistry it has been the cry—"If we could only find a plastic material that had the translucence of tooth structure and the lasting qualities of gold, we would then have realized our ambition."

Plastic porcelain has been thrust upon the market time after time, only to be proven worthless, until we have been led to treat all with doubt, and I venture to say that many doubt now that there is anything on the market that will last a long enough time to pay for inserting same. It seems the profession of dentistry is today at the highest point ever attained; private and public philanthropy have been enlisted in the humanitarian idea of conserving the health and stamina of the race by education and the expert treatment of the teeth of the young, the sick and the indigent, and while we must always admire the great pioneer dentists whose resourcefulness was responsible for establishing the profession on a secure foundation, yet the best dentists the world ever knew are in practice today. Dental students have a much better chance in learning than ever before in equipment of dental schools. Besides, the educational advantages of the present generation make up a higher average of equipment of the students entering upon a dental course.

The expert manufacturers have grown along with the expert dentists and there is little that is demanded that is not produced. Nothing shows more strikingly the progress in dentistry than the improvements in the material used in tooth restoration; but gold in improved form, better alloys and a higher grade oxyphosphate, while making an advance, have not even approximated the ideal as filling material. The porcelain inlay promised

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Read before the Cleveland Dental Society.

much, but the technic of its making and insertion was so elaborate and demanded such skill that it failed to acquire a very large place in dental practice. You ask me—Do I make them? Certainly I do, but not as often as I did.

The matching of tooth structure is extremely difficult, the line of cement discoloring and the unreliability of cement has led me to look for something to better please my patients as well as doing it in a humanitarian way, and, gentlemen, I believe that you will all come to use more and more of the plastic porcelain as your confidence is restored in using it. It is safe to say that if shades are carefully chosen, fillings may be made that cannot be detected without a glass, that retain their appearance permanently.

MIXING

Absolute cleanliness is imperative; no foreign element must come in contact with the powder, liquid or with the plastic material. Do not touch with the hands. The powder bottle must be kept stoppered; the liquid bottle kept securely capped at all times, its mouth clean and free from acid. Now, unless you follow out instructions as given you cannot possibly succeed. Use a large, thick polished glass slab, kept clean, and used only for the one purpose—a slab with a rough or scratched surface or one used for mixing other filling materials may appear clean and yet carry on its surface elements that spoil the porcelain. Clean the slab and instruments each time with alcohol. Spatula must be of agate. The best results are obtained with not less than three drops of liquid for a mix. Make the mix promptly, avoid delay, as the water in the liquid will undergo evaporation, retarding setting. Never dip the spatula into the liquid or powder. Begin with sufficient liquid and do not add more at any stage and proceed by drawing into the liquid the powder, thoroughly spatulating and incorporating each. The first quantity of powder drawn into the liquid should be comparatively large—equal in bulk to the amount of liquid. Begin with a rotating motion, holding the spatula flat; when the mass becomes homogeneous, add successively smaller quantities of powder,—spatulating each thoroughly. The vital point is in the mix: perfection can only be attained through patience and determination.

The average time available per filling is two minutes: the temperature and humidity may cause a slight variation. It should be not quite as thick as oxyphosphate used for a filling. In lifting the spatula, the mass should not string after it. To cool the slab will retard setting a little; to heat the slab will hasten setting. In filling, the tooth must be kept absolutely dry to get the best results. Where this cannot be done, do not attempt to use plastic porcelain. Make the cavity retentive with square margins and no overhanging thin walls. Fill the cavity slightly to excess, using non-metallic instruments, absolutely clean and free from grease or other impurities.

Introduce the plastic porcelain into the cavity in the following manner : take a small quantity and cover the walls of the cavity, thoroughly working in well to all undercuts; then try and introduce the balance in one lump large enough to more than fill the cavity, working porcelain to the margins with a little excess. A celluloid strip should be drawn around the filling while the porcelain is plastic and held in position from 2 to 4 minutes. When the strip is removed, coat the filling with cocoa butter, allowing it to remain ten minutes. For simple cervical cavities, prepare the cavity in advance—filling to excess with gutta-percha. At the next appointment use cotton rolls, remove the gutta-percha, dehydrate cavity with alcohol and paint the gum with a weak solution of tri-chloracetic acid to prevent seepage, fill in the usual way, coat with cocoa butter, allowing it to remain 10 minutes. If you finish at this sitting, keep away from the gums, as hemorrhage would cause discoloration. I coat these cavities with wax and finish at a subsequent sitting. You will have to make a note of their position and that you are to polish them or you will never see them. Do not use chisels in finishing, but fine cuttlefish disks and strips coated with cocoa butter. In contour work caution the patients to be careful for several hours.

Celluloid ring matrices are a great help in building up large contours in molars and bicuspids, placing them securely in place by the use of absorbent cotton packed between the sound part of the tooth and matrix. If the bottles are kept securely capped at all times to prevent evaporation it may be used to the last drop. Do not use pigments—colors are permanent; by combining the lighter with the darker shades the desired shade may be obtained.

I do not think there is any excuse for filling the bicuspids or first molars with amalgam where there is the slightest chance of discoloration. Children will not object to amalgam, but after a few years, when they are no longer children, but can see and think and talk, be sure they are not saying something like this about you: "Why did Doctor put that old silver in there? What a shame!" You try to excuse him by saying—"perhaps he was tired."

Where a gold crown is prominent cut out the face of the crown representing a facing, to retain a filling and insert the porcelain. You will be delighted with the results. In some of the good old time gold fillings you can cut cavity and insert the plastic porcelain, changing the appearance, even though it is only a small piece. You can repair bridge work, restoring facings where pins are in place, and it will stay. Where you can make undercuts, by all means do so, cutting into the gold and fill the same. You will then be sure of retention stronger than anything held in by cement.

If you want to make a nice porcelain inlay for a large cavity in a molar, get the impression, make a model in amalgam, coat amalgam with cocoa butter, insert plastic porcelain and shape as desired, remove and insert as porcelain inlay. Charge for plastic porcelain what it is worth. Exercise all the pains necessary for an ideal operation and make the price accordingly, which should equal or exceed the price of gold.

I have watched the plastic porcelain with a great deal of interest, and as I have noted the success as well as the failures, having seen many fillings that have been in the mouth from two to five years that were perfect, and one case where there were over 15 plastic porcelain fillings that had been in from three to five years, and all in perfect condition, showing no change whatever.

In conclusion would say, each one has his own salvation to work out. Each will do it in his individual way, and I want to make the statement that I believe in five years plastic porcelain will be used in over 60% of the cases. Whatever you do, or whatever you use, do not be like the lightning bug:

The lightning bug is a brilliant thing,
But the insect has no mind;
So it goes stumbling through the world,
With its headlight on behind.

James Whitcomb Riley says:

I've always noticed that great success
Is mixed with trouble, more or less;
And it's the fellow who does the best
That gets more kicks than all the rest.

DISCUSSION

Dr. W. D. Bissell: We sometimes wish that our silicate fillings were like the insect referred to by the essayist and that they had their ''headlights on behind,'' for some of them certainly are not a thing of beauty after a lapse of a few days, more or less.

We tell our patients that they are very esthetic and that they add greatly to the appearance. The fillings are truly beautiful when the patient leaves the office. But when the same patient appears a week or ten days later and asks if there is not a little change in the appearance of the filling, the dentist reluctantly admits that there is a slight discoloration or shadow around the filling, a darkened portion of the tooth showing through for which the dentist or the filling material is not responsible, and then breathes a sigh of relief as the patient leaves the office somewhat reassured. In six months, and probably less, the dentist will admit without argument that for some unaccountable reason the filling has changed color. This he must admit, or plead guilty to an attack of color blindness at the time of selecting the filling material.

We wish we could be as optimistic as the essayist. We could look forward to future appointments with our patients for whom we have placed silicate fillings with greater pleasure and confidence. As it is, we cast an inquiring glance at them as they enter, and if we are rewarded by a pleasant smile and reassuring expression of satisfaction as to the appearance of the filling we had placed, we confidently explain that this is the finest filling material ever produced and then proceed, if possible, to influence the patient to allow gold to be used in the present instance, as you think the exigencies of the occasion require it.

The first silicate sample that came into my office found its way into the waste basket, where most samples go, and it was months later before I was induced to try it, and then it was a brother dentist who told me that he had given up the baked porcelain filling for the plastic porcelain. And while I never was enthusiastic over the baked porcelain except for large restorations, still I felt that if the plastic porcelain could be compared favorably with the baked porcelain, it was worth trying.

Well, I tried it, and it looked so well that I continued to use it in spite of the fact that many of the first fillings, yes, most of them, discolored and disintegrated more or less. With better technic, resulting from experience, I later have had better results. This week I saw a mouth in which I placed five Ascher fillings five years ago. Two of them I am to replace, as the surface has disintegrated. All have changed color slightly. They are approximal fillings in the upper incisors.

I think I never saw a silicate filling that was not slightly etched on the surface, if it had been placed for any length of time. They do not retain the fine polished surface that they get at the time they are placed. I noticed that in a labial or buccal cavity, where the material can be well packed and adapted to the cavity, we get the least discoloration, or perhaps I should say no discoloration.

This material is mixed so thin that it is very difficult to press to place to adapt it to the walls of the cavity, especially in deep approximal cavities not made very accessible in preparation. In the deeper cavities I place a base of oxyphosphate and then just a veneer of silicate. I have been tempted to try the Phenakit filling, as I understand it is mixed until almost crumbly and could be placed with considerable pressure, which would result in better adaptation to the cavity. Has some one had experience with this filling?

With the synthetic filling we are hampered by being confined to agate or similar instruments for its insertion. If we would take the time always to separate the teeth and prepare the cavity as carefully as for gold, we would no doubt have a larger percentage of fillings that would give satisfaction. With a plastic we try to save tooth substance that we would not with gold, which makes the placing of the filling more difficult.

We are told to use celluloid strips to draw around approximal fillings to force them to place. With this strip there is a great deal of elasticity which I find will spring away from the filling and draw it from the margin. I use almost entirely the silk strip, the non-abrasive amalgam strip, with or without cocoa butter. It will loosen from the filling as well as the celluloid and is not elastic and one can burnish over the strip with great advantage.

I use the silicate in children's teeth when too soft to hold gold fillings, in teeth too frail for gold fillings and where the patient does not care to be put to the expense of gold. I think one can place them at the cost of a third to a half of the expense of gold.

I once built up a molar crown of the silicate. It was there a couple of years later. The remains may be there yet, but I prefer not to have the patient draw my attention to it.

To the novice I would suggest that he should not try to improve the appearance of the buccal or labial surface of a gold crown with silicate until he has mastered its use in other places. I may also say that the friend who recommended the use of silicate cement to me and was so enthusiastic in its praise, has not the same enthusiasm for it that he formerly had.

In conclusion I would say, do not expect too much from silicate cement in its present development, although it is almost indispensable.

We are not all of us Samsons, so we had better be careful how we use the jawbone of an ass.—Lippincott's.

WHAT ARE WE GOING TO DO ABOUT IT?

BY FRANK W. SAGE, D.D.S., CINCINNATI, OHIO

EVERY LITTLE WHILE someone gets up in a dental convention and gives the profession an overhauling for not knowing its pathology better, for knowing so little about medical science generally. The hearers are usually easily able to anticipate what is going to be handed out to them before the speaker has ended his second sentence. Often after he has taken his seat, the case seems rather hopeless, everybody feeling that nothing but kindly forbearance and courtesy restrained the speaker from so declaring. Dentists without the M.D. degree find themselves rather a poor lot, fit only to be cast out—wonder if they ought not to quit practice.

In the lobbies, after adjournment, may sometimes be found half a dozen envious spirits boldly charging the speaker with designs looking to withdrawing from the body of the profession, and forming with a few congenial (M.D.) spirits a little coterie of really-worth-while dentists. They all feel very badly about it until some optimist gets up and reminds them of various deans of dental schools attached to universities who have managed to attain high honors without the affix M.D.

Seriously, the sentiment referring to dentists' need of medical training has gained ground enormously within a decade or two. That wholly unconscionable question, "Is dentistry a specialty of medicine?" is no longer discussed. Everybody today admits that the more a dentist knows about medicine, the better for him and for his patients, which is, however, a different proposition from asserting that the best dentists are the ones who know the most about medicine.

This question of medical education for dentists has thus far been discussed to so little purpose, in dental conventions, that I am tempted to touch upon what seem some of the salient points requiring consideration, whatever measures for the future advancement of the profession may be found requisite.

One most encouraging feature of the present situation requires a passing word—the manifestation of regard and esteem for our professional body of late years more expressly evident on the part of our medical brothers. Since the era of sky-scrapers in our cities, that is, for some twenty years, the association of dentists through the accident of proximity with physicians, sharing offices with them, sharing in consultations, has operated enormously to cement the feeling of fellowship, of interdependence between the two professions. This has, furthermore, been an important factor in enhancing the dignity of dentistry, this mere fact of contact and association. It matters not that this may be esteemed wholly fortuitous; the fact remains that dentistry has greatly benefited by this merest accident of propinquity. The dentist's patrons, finding him thus intimately associated with the physician, have unconsciously come to esteem him more highly. The dentist himself has been stimulated to self-improvement in one way and another, ofttimes in the way of taking up the study of phases of medical science having a recognized bearing on dentistry. The physician has come to discover in his brother of the younger profession one worthy of his esteem, from whom he may learn, as well as one to whom he may impart knowledge—a most happy consummation, on which each may felicitate and congratulate himself.

In papers and in contributions to journals of the profession, the writer has for years consistently maintained that the dental profession needed no vaunting, no apologists, no extraneous boosting, to come into its own. When the press belittled our profession in convention assembled, it has always seemed to me too puerile to be given the slightest heed. Through sheer force of natural uplift dentistry has already risen above the reach of such pettiness. While the legal profession is today actually declining, medicine and dentistry command more respect than ever, from thoughtful people everywhere. The beginning of this has been in the professions themselves. At the Toledo meeting of the Ohio State Society, last December, no one could possibly have failed to notice the fraternal spirit—genuine, spontaneous—breathing through the speakers' remarks, physicians and dentists meeting on one common platform. It was inspiring.

Pending the settlement of the question of educating dentists up to the medical standard, why not try this intimate association of physician and dentist in smaller places? No village is too small for the experiment. Many advantages would accrue to both. The physician might lose some extracting, but that would be offset by advantages I need not take space to name. Not the least advantage to the dentist would be the opportunity for early consultation, in numerous cases which under present conditions are tardily brought to the physician's notice.

The dominant consideration in contemplating the expediency of medical education for the dentist is, what does the public require of the dentist? To the public, after all is said and after all argument is exhausted, the final appeal must be made. If our patrons want superior dentistry most of all, we must meet that demand; no matter what our students may be required to superadd to dentistry, as popularly defined, they must first of all be real dentists. If a preliminary course, embracing all of medicine that physicians acquire, be required of the student applying for the dental course, the public, sooner or later, is going to inquire into his natural qualifications for dentistry *per se*, caring less for his medical qualifications. If we could enact laws requiring this thorough preliminary medical course, and if it should transpire that such exactions actually shut out large numbers of young men from dentistry who might readily have become good dentists, then we might look to hear a cry for the repeal of that particular statute. Such a cry would surely be raised in case the number of competent dentists appreciably fell away.

This question is far more involved, beyond doubt, than at first glance might be imagined. It is not a question as to whether the interests of dentistry require that all matriculants in dental schools show a medical diploma, at all; the real question is, Do our patrons, the public, assent to this requirement? Ultimately it will come to that, whether we like it or not.

Undoubtedly the ideal dentist is he who combines all requirements both of medicine and of dentistry proper, in his equipment. How many such can the profession of today boast? In this arraignment of dentists for their ignorance of medicine, it might perhaps not improperly be asked, How many of these critics are themselves fully equipped? Is the dentist who, while practicing dentistry half the day, attends medical lectures the other half, quite sure of himself? Is there any occasion for suspecting that he may not be as well informed as his classmates? Did his dental college course presumably include all he now misses at the medical college?

Where today would be the long list of men who have honored dentistry, have invented appliances and improved on methods, with but little knowledge of or interest in medicine, had there been these proposed restrictions?

The writer has always held that dentistry is *sui generis.* It is essentially mechanical, mechanical it ever must be. You cannot make it over into something else. Here and there we find a man who combines a taste for medicine with rare mechanical gifts, qualifying him for the highest rank among dentists as a dentist. It is a question whether such men, attempting to practice the specialty of dentistry and a medical specialty, together, are not always eyed askance by others, either physicians or dentists or both, who give their whole time to one only. A few such there are.

The question of expediency comes in when the dentist having a medical education sets up to practice the more serious forms of oral surgery, for which he assumes to be specially qualified. How can such a specialist assume all involved responsibility for his cases, as the general surgeon does? Avowedly giving only part of his time to this specialty of dentistry, can he follow his patient through obscure complications liable to arise, wait on him in his home or at the hospital, as the general surgeon does?

Years ago a patient of the writer's developed what presently proved to be a sarcoma, simulating an alveolar abscess. He removed to a distant city, consulted a dental specialist, was operated on four times within a year, finally dying. The family blamed the dentist for not having referred the case to a general surgeon, arguing that the latter, having doubtless many more cases yearly to treat than a dental practitioner, ought to know more about treatment. Yet this dentist was the dean of a dental college.

I am told that the German dentist possessing the medical degree seeks a solution of this vexed question by assuming to treat aching teeth, to minister to the dental patient in all particulars which have reference to medication, surgery, etc., after which he is referred to an underling for such merely mechanical service as fillings, bridges, plates. If this be true, it seems to the writer an almost ludicrous attempt at evasion of the question, a cutting of the Gordian knot. There is no solution of the matter to be found in all this. It is not an uplifting of dentistry; it is merely a presumed uplifting of oneself above dentistry. It is merely another way of emphasizing the inferior degree of dentistry as compared with medicine. Are the dentists of America prepared to accept this attitude toward our chosen profession?

Dentistry need not be merged in medicine; it probably never will be. As a profession it need not feel any prickings of chagrin because it is not medicine. By methods of induction it must, however, gather to itself far more of medical information than it today has. Dentists need to know much more about idiosyncrasy, dyscrasias, temperament, and that for their own defense against waste of time and service, aside from that which is due the patient. I still believe the dental schools will in time provide all that is needed. The M.D. degree is unimportant; the equipment of the dentist to fulfill all requirements made of him as a dentist, is all-important. Dentistry and medicine may move hand in hand, each conceding this to the other—that to be successful in one direction, one must ofttimes be satisfied to remain ignorant of many things in another direction.

AMALGAM*

BY HERBERT L. WHEELER, NEW YORK, N.Y.

IN PRESENTING A PAPER upon this somewhat old and yet ever-interesting subject, I shall not endeavor to review the work of Dr. J. Foster Flagg, to whom, in my estimation, the profession owes a debt of gratitude it can never repay; neither shall I dwell long upon the experiments of Dr. G. V. Black, which have been exceedingly useful in assisting the supply houses to compound and produce an alloy for amalgam fillings that is probably as nearly up to the demands made upon it as any combination of metals, in their metallic state, will attain. The ever-recurring question as to whether amalgam is most useful because of certain qualities which are said to contribute to the prevention of tooth decay and disintegration or whether it is useful simply as a stopping which will maintain its form and prevent leakage, I will leave for others to decide. I do not believe it has been definitely settled yet, in spite of the almost unanimous acceptance of the latter theory.

As far back as 1895, Prof. Kirk wrote, in an article which appeared in the *International Dental Journal*, for April, of that year, as follows: "There are now to be found and are everywhere obtainable, alloys that fulfill their functions as savers of teeth, under certain conditions, in a manner unapproached by any other material." This was previous to the experiments of Prof. Black.

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*Read before the Cleveland Dental Society, 1914.

Prof. Flagg had found that amalgam, in his hands, in spite of the shrinkage, the unsightly black ditch, the offensive color, did save teeth that otherwise there was no means of salvation for.

In 1841 the American Academy of Dental Surgery appointed a committee to report upon all filling material of which mercury was a component part. The committee reported all such material as injurious to the mouth and teeth. The societies adopted the report unanimously. Nevertheless such men as Flagg, Palmer and Case stuck to its use, and what is more, saved teeth with it. It is obvious that as the profession came to have an understanding of bacteriology of the mouth and a better knowledge of the causes of caries of the teeth, the opinions concerning the value of amalgam as a filling material would have to be revised. The starting point of this work of revision seems, to me, to have been the series of experiments carried on by Prof. Black, which were published in the *Dental Cosmos,* in '96 and '97. Previous to this time, if I interpret the writings of that date correctly, those mostly interested in the use of amalgam claimed therapeutic or preventive value upon tooth decay for amalgams, but even at this time the most of those who used amalgam were looking for something that could be used that would retain its shape, its color, its edge strength, and not make it necessary to apologize for it, after it had been placed in the mouth.

Prof. Black's experiments, as I have pointed out, resulted in the production of an alloy which, although not quite fool-proof, could be used by those of ordinary or mediocre skill, and yet obtain results. With his knowledge of bacteriology and the workings of the destructive process of decay of tooth structure, Prof. Black evidently set about to obtain an alloy that, mixed with mercury, would neither contract nor expand, hence it would make a perfect plug, which is all that can be accomplished by most metallic fillings we may place as a stopping in a decayed tooth.

Now, there are some types of amalgam that have been used in the past, and I presume are used today, such as copper amalgam, Flagg's submarine, which is composed of silver 60, tin 35 and copper 5, which were supposed to have a direct preservative effect upon tooth structure, and this idea is probably based upon accurate clinical observation, for Prof. Miller, in his book on "Micro-organisms of the Human Mouth," on page 329, says: "Experiments prove that even dentine from teeth filled with copper amalgam retarded or prevented decay for some time," and on page 244 he reports fifteen teeth filled with copper amalgam, upon which efforts to produce decay proved negative. He also found that sprinkling sulphate of copper in the cavity before filling had the same result.

The experiments of Doctor Flagg and Doctor Miller are what have led me to suggest that possibly we have not been wise, to entirely neglect to carry on research work along the line of finding a filling material that might act as a preventive of decay as well as a stopping.

I remember that among the formulæ recommended by Prof. Black was one of 68.5 silver, 25.5 tin, .5 gold and .1 zinc. This was published in

'96 or '97 and Prof. Black said of it, at the time: "This has been watched long enough to assure its success."

As this was similar to a formula produced much earlier by Prof. Flagg, which was silver 68, tin 27, gold 4, zinc 1, I had ten ounces of this amalgam made at the time; I also had ten ounces of the formula, silver 70, tin 26, gold 3, zinc 1, which was used in the Philadelphia Dental College when I was there in 1889 and '90. Both of these alloys proved unsatisfactory for the reason that they set too readily and expanded too much for me in the method that I was then using, of placing amalgam fillings and contouring them to shape by the use of burnishers.

Other formulæ given by Prof. Black as ones that had given promise of satisfaction, were silver 64, tin 30, copper 4, zinc 1, silver 74 and tin 26. The one of silver 64, tin 30, copper 4 and zinc 1, seems to be the basis upon which the manufacturers have established their present product of quick-setting alloys. Analysis made for Doctor Flagg in 1897 and '98, showed that Fellowship Alloy was composed at that time of silver 67.73 parts, tin 26.33, copper 4.71, zinc 1.23.

Twentieth Century Alloy, silver 66.81, tin 27.32, copper 4.29, zinc 1.51.

Analysis made by Doctor Burns, of Massachusetts Institute of Technology, for the New York Institute of Stomatology, in 1908, showed the following analysis of some of the leading alloys:

	Silver	Tin	Copper	Zinc	Gold
Twentieth Century	67.03	27.13	4.87	1.10	....
True Dentalloy	65.91	27.13	5.21	1.52	...
Standard Alloy	53.55	53.03	2.76	....	8.82
Fellowship Alloy	67.45	26.80	5.73	0.55	....
Odontographic Alloy ...	66.87	26.48	6.21	trace	0.28
C. Ash Sons Co. (C.A.S.) Alloy ...	66.54	27.16	5.02	0.90	...

These formulæ seemed to indicate that the composition of most of the successful alloys on the market today is similar. They also indicate that the manufacturers have found quite as good results with alloys that contain neither gold nor platinum as they did with the so-called gold and platinum alloys.

Personally, I am pleased with this, for I believe that any formula of any metals, such as amalgam, that can be used in the mouth for fillings that will retain their shape and color, so that they make a good plug and are not unsightly, are a desirable filling, and just what they contain is a matter of indifference, so long as we accomplish results with them.

I do think, however, that in order to keep good records, apply them intelligently, and serve the best interest of our patients, it is necessary that we should have a knowledge of the formula of any compound filling. Through having such knowledge, I have succeeded in obtaining good results with various formulæ, and apparently as good results with formulæ of the old type amalgams as with the modern product of the manufacturers.

This has led me to believe that some things besides the proportion of the various metals combined in alloy, their so-called ageing and other characteristics, are not the only qualities to be considered.

Doctor J. Morgan Howe, of New York City, in the *International Dental Journal* of 1894, shows that the coarse grains of the same lot of alloy make a much more plastic mix, with the same relative amount of mercury, than do the fine ones.

In carrying on these experiments he used three different formulæ, and found that the mercury required to obtain the same plastic mix with the coarse grains was 33 1-3 per cent. less than with fine grains.

He also found that the ones mixed from the coarse grains and ones from the fine grains hardened with equal rapidity up to about two hours; from four hours on, the coarse grains seem to be considerably harder. This would indicate, in some cases, at least, that the less relative amount of mercury the better the final results.

About 1901 I became associated in practice with Doctor Howe and was with him for over ten years, and from him I learned the method of handling amalgam which I am going to advocate to you this evening.

I believe it is customary among the majority of well-known dentists of New York City who use amalgam, to use a matrix in all cases where there is a compound cavity, so that pressure may be exerted upon the filling material, when it is placed. This pressure naturally presses the mercury to the surface, and in order to absorb this, mercury is not pressed through chamois skin, as recommended by Prof. Flagg, but more fillings are mixed with the surplus mercury, which is removed from the surface from time to time until the entire filling is hard and firm and no more mercury can be brought to the surface. In some cases the filling is packed under bibulous paper or spunk, but I have not followed this method. I have, instead, used precipitated silver to absorb the final surplus of mercury, and then removed this with a sharp spoon excavator. When a filling is completed in this way, it is so firm that it can be safely trimmed with a sharp knife or scraped with a spoon excavator to give it the proper contour and form.

Where I wish an especially hard filling, which is most of the time, I have found S. S. White's True Dentalloy very satisfactory, but I have used and do use, at various times, two other amalgams--one that Doctor Howe had made when I was associated with him, composed of 49 parts silver, tin 48, gold 2 and platinum 1, and another one made by Doctor Benment, of Lockport, N. Y., which has a formula of 49.85 silver, tin 49.55, zinc .45 and gold .15.

I have satisfactory fillings made under the method above described from all of these alloys though I use more of the True Dentalloy than I do of the others, and I think, on the whole, it gives better satisfaction though you have to work much more quickly.

Now, what is the reason for using an alloy filling at all? In some quarters it is still condemned as being conducive to slack methods, slovenly work and unsatisfactory results. For my own part, my reasons for using it seem simple and reasonable, and I see no reason for apologizing for its use.

I believe if such misfortune could happen as leaving the dental profession with but one available filling material for use in saving teeth, that if that material were amalgam, it would result in the greatest good to the greatest number, to the extent that the loss of the other filling materials would hardly be worth considering, except for the unsightliness of the amalgam in some conspicuous places: but if anything used by dentists, up to the present time, is more unsightly and offensive-looking in the human mouth than gold conspicuously placed, I have yet to see it. Yet I prefer gold, either fillings or inlays, in some cases, and especially in some places, but not where it shows. I would no sooner use gold in a conspicuous place in the mouth than I would amalgam; in fact, from my observation of nearly twenty-five years, I believe amalgam is less unsightly in some conspicuous places than gold, but before we go farther, let me state why I do not confine myself to any particular filling material or brand of filling material in my work as a dentist, nor do I confine myself to any type or kind of filling to be used invariably in some particular place.

When I consider the replacing of a filling to restore the lost part of a tooth, the first question that presents itself to me is, what is best for the patient? Now, there are reasons why, under no circumstances that I know of at present, could I be persuaded to place anything but plastic fillings in the teeth of some of my patients. These fillings may be amalgam, they may be oxyphosphate cement, silicate cement or gutta percha, and in many instances I consider them so far superior, everything considered, I would feel that I was doing my patient an injury were I to attempt to use gold, either as foil or inlay. Just the same as there are instances where I use a silicate cement, in spite of its many obvious shortcomings, in preference to a porcelain inlay, because I believe the welfare and interest of my patient demands that I shall do so.

Now, let us make a comparison: Suppose you, being ill with a well-known disease—it might be pneumonia, it might be typhoid fever, it might be tuberculosis—were to employ a physician, and he should give you not merely the same remedy which he prescribed for everybody else with that disease, but should give you, in every way, the same treatment, the same food, and require you, at every point, to be attended to by a system and method of treatment that, we might say, was thoroughly indiscriminate and inelastic—how long before the worthy physician would be either without a practice or up for malpractice? Not long, I am sure.

Now, why should the dental profession attempt to confine itself to one particular scheme or hobby and ignore the physical welfare of the patient?

Did you ever stop to wonder how many patients have been sent to the sanitarium with a nervous break-down because of the long hours spent in a dental chair having monuments of gold malleted into their sensitive teeth until the poor quivering nerves can stand no more, and the patient breaks down with hysteria, almost before leaving the dental office?

The question in dentistry is not, what shall we fill teeth with? but, how shall we *preserve* them? Incidentally a contribution to the health and comfort of the patient is a step towards preservation of good teeth and a healthy mouth. I wish it understood that in preparing cavities for the insertion of a filling, I use as much care in the preparation for one kind of a filling as I do for another. By this I mean due care is employed in removing disintegrated and decayed tooth structure, also in shaping cavity to obtain the greatest strength and proper edges of the cavity to obtain the best results. I also polish my fillings after insertion—amalgam, silicate, cements and gold inlays at a later sitting; gold fillings and gutta percha at the same sitting.

I cannot see why one is justified in being more careless in attention to details with one kind of a filling than with another, and I do not see how or why the kind of a filling material I use in building up lost tooth structure and preventing future decay, should affect my fee in the least. For time required, I believe my time is worth as much, whether it be a gutta percha filling or a gold or porcelain inlay. Furthermore, it seems to me that when I place a well-made, well-shaped, well-polished amalgam filling in a poor old broken-down molar in such a way as to reproduce good masticating surface and a condition that can be kept clean, I am doing more and better for my patient than the man who places a gold crown with an uncertain masticating surface and an edge which produces a shelf, sufficiently wide to make a breeding place for bacteria sufficient to poison much of the food that enters the stomach.

560 Fifth Avenue.

DISCUSSION

Dr. F. J. Spargur, Cleveland: The Cleveland Dental Society extends a very cordial welcome to Dr. Wheeler, I am sure, and feels honored by his presence. His very excellent paper has been listened to with pleasure. Its careful digestion cannot but be profitable. Amalgam as a cavity filling material must be given due consideration by the dental profession whether it desires to do so or not, for it has, in the past, and does now, occupy a most prominent place among filling materials. There is no sign that its shadow is growing any less as time goes on, in spite of the prominence given other materials and methods for tooth preservation. Amalgam is more frequently used in the average dental office than any other filling material—perhaps more frequently than all others combined. A very large percentage of the patrons of dental offices—fully seventy-five per cent., some one says— must, for obvious reasons, rely upon amalgam fillings for tooth preservation. If this be true, as it doubtless is, it seems to me that it becomes the serious duty of the dentist to make the most of it, and, by whatever painstaking effort is necessary, to bring out all there is of virtue in the material. I am convinced that if this course is followed, amalgam will give a good account of itself, and will need no apology. Amalgam has held its own under the most shameful abuse; that it has survived at all is proof of its adherent good qualities. I doubt if gold, porcelain or any other material at our command would have withstood so bravely the test of sloppy handling. I am among those who believe that properly mixed, properly inserted in a carefully prepared cavity, and properly finished, amalgam will stand up with any material at our command. My observation has led me to believe that many dentists would serve their patients better if they used more amalgam—properly, and less gold—improperly. As great skill and thoroughness are required in the proper insertion of an amalgam filling as in most other things a dentist is called upon to do, and I feel that we cannot do better than to endeavor to improve our technic by the study of the methods of such men as our essayist. I would like also to call your attention to an article by Dr. William R. Pond appearing in the *Items of Interest* for January on "A New Gospel, and an Appeal for Higher Art in Amalgam Fillings." In this article Dr. Pond shows the possibilities of amalgam in the anatomical restoration of occluding surfaces as advocated by Dr. Young and others.

I find nothing in Dr. Wheeler's paper to take issue with—it is excellent and covers the ground. I commend his advocacy of amalgam, his appeal for thoroughness, and, as far as he went into detail, his method of using it. Particularly do I endorse his statement that he sees no reason why his fees should not be the same for amalgam work as for any other service that he is called upon to perform. I am beginning to see that a man should not try to practice as trying a profession as is dentistry who lacks the moral courage to demand and collect a proper fee for his services—regardless of the character of the service—always, of course, with the provision that the service is good. We should get away from the idea that we are selling material. It is service that we are called upon to give, and it is service that our patients have a right to demand, and it is for service that we should be paid. Use amalgam where it is indicated—use it carefully and well, and make your charge for the time consumed. A set price for a gold filling—a set price for cleaning the teeth (for prophylactic treatment if you please) a set price for any service that we are called upon to render is an abomination. The set price should be abolished. I emphasize the financial side of the question inasmuch as our essayist has given me the opening, and because I believe it has been the cur at the heels of amalgam from the beginning.

Dr. J. R. Owens: In the discussion of the subject Amalgam as a tooth preserving material, it is truly, as the essayist has stated, a "somewhat old and yet ever interesting subject." This is because of its extensive use by the average dentist. It seems to me more important to consider it today than ever before, because it is used more than ever before. In my college days we were not permitted to use amalgam filling at the college. Tin and gold were the order of the day. While I am an advocate of amalgam, I believe the graduate would be more efficient if that rule still prevailed. However, we must accept the condition that exists and do our part to stem the tide of slovenly-filled teeth with amalgam.

Of the making of alloys and what are the best combinations I will pass with the commendation of the work done by Flagg, Black, McCauley, Ward, Atkinson, Bliss, Garhart and others.

Dr. C. C. Farrell's article in *Items of Interest*, September, 1913, "The Manufacture of Alloys and the Manipulation of Amalgam," and Marcus L. Ward's in the *Cosmos*, November, 1913, "Conflicting Opinions Concerning the Manufacture of Alloys in Dental Amalgams," give a very good resume of their work to date, which I heartily wish every dentist to read.

Dr. Black has about concluded that a silver and tin of the proportion of 72.5% silver and 27.5% tin produce the best alloy. His modification of this, with the addition of a 4% or 5% copper, produces good results. Such a combination recalls the Lawrence Amalgam, which has been in use for the last forty or fifty years and probably is as good for preserving teeth as any alloy now used. Its color has been its chief fault. I see yearly a filling of large size made with Lawrence Amalgam and which I inserted about 1877 and is perfect today. Dr. McCauley's experiments would indicate that Rego alloy and Crandall's alloy were excellent products. But having chosen the best alloy there remains the personal element of the dentist, which amounts to 80% of the success or lack of it in satisfactory fillings of amalgam. Some of these elements are amount of mercury incorporated, manner of mixing, age of the alloy.

The preparation of the cavity, thoroughness of removing decay, keeping the cavity dry, method of inserting, the finished filling.

I believe I can serve you better by detailing my way of treating these various steps to success rather than discussing Dr. Wheeler's paper, with which I generally agree. First, amount of mercury incorporated. I use just enough to overcome the granular appearance of the alloy. The mix is done in my hand or a soft rubber receptacle, using my right index finger as a pestle (the heat of the body hastens the incorporation of the mercury) stopping the trituration as soon as the granular condition disappears. The mercury is then wrung out with chamois skin assisted by pliers. There will be very little mercury removed and it will leave the mass quite solid, which will break when separated.

Because of the statements of the men I have named that alloys make a softer filling with age and finally become unsatisfactory as fillings if too old, I endeavor to get alloy put upon the market within a year.

The preparation of the cavity should be as careful as for any filling made. That is, *all* decay *must* be removed. There is never any contingency that allows that not being done. I feel that is where many dentists fail. There is no strength in a decayed tooth and it will continue to decay under any filling. The walls of the cavity need not be as firm as for a gold filling, but they may be, and generally should be, when weak, re-enforced with cement. I prefer oxychloride of zinc, and this I use in all deep cavities, filling them to such an extent as to leave the cavity as simple as possible. This does several things toward preserving the tooth. First, no decay will start under oxychloride of zinc, the color of the tooth is preserved, the thermal changes are least noticed, the weak walls are strengthened; and by no means least, the mass of the amalgam is less and, therefore, less inclined to change its shape. And if it shrinks, the discolored margin extends only to the cement.

To keep cavities dry I almost always adjust the rubber dam for all proximal fillings. The lack of doing this, I feel sure, is the cause of a great many fillings failing. Moisture is more than likely to get in the cervical margin of the proximal cavity even when considerable pains have been taken to prevent it without use of dam. I take no chance. I condemn dentists who do. Where the cavity extends far above the gum I make a coffer dam of my steel matrix, wedging it to place with wooden wedges. Then I have a perfectly dry cavity where I can take all the necessary time to do each step of the operation.

To insert the filling I make each cavity a simple one wherever possible, by means of matrix. I use for this ribbon steel cut for each occasion as the cavity requires. The matrix I wedge either with Ivory's wedge or more generally with wooden wedges, inserted from either side so as to insure a tight approximation on both labial and lingual sides of the cervical margin. All of this is done before the amalgam is prepared. Then when the cavity is ready, instruments selected so there will be no delay, the amalgam is prepared and inserted in sufficiently large portions to have a considerable mass before the flat-faced, serrated plugger to force to place. First mass to the cervical border, next to lingual then to labial then wedge these in the center. I do not care to use such force as to cause free mercury to come to the surface. I remove it at once with tin foil, being careful to remove all the tin with an excavator before inserting more amalgam. The cavity is slightly more than filled and this is trimmed down with proper excavators and burnishers. The surplus pressed through between the matrix and buccal and lingual walls is cut away with bistoury or similar cutting instruments. The wooden wedges are then removed and with suitable pliers I draw the matrix buccally and lingually from between the teeth. The contact point is all to be desired, owing to the spreading of the matrix until it comes in close contact with the adjoining tooth. The matrix being perfectly flat is easily withdrawn without disturbing the mass of the filling. This I feel to be very important. In a shaped matrix it is almost impossible to remove it without breaking or disturbing the soft filling.

Lastly, the finishing. Amalgam fillings should be as carefully finished as any gold filling. The durability of its preserving quality as well as its appearance depends upon the finish. To my mind a well-finished amalgam filling, where it is kept bright, is as pleasing to the eye as a gold filling. This finishing I do at a subsequent sitting, being careful of pressing the contact point as I would a gold filling. Strips, disks, polishing powders and finishing burs are all brought into use.

We must exalt amalgam to the place where it really belongs. With respect for it and honest, skillful use of it, it becomes the most widely serviceable agent the dentist has at his command in preserving decayed teeth. It is not a cheap servant, only as it is used by cheap dentists.

PYORRHEA*

BY W. T. CHAMBERS, D.D.S., DENVER, COLORADO

NOTHING NEW OR ORIGINAL is presented for your consideration in this paper, and no attempt is made to explain the cause of pyorrhea. My only desire is to stimulate and encourage those who feel in the least discouraged, and to urge those who are not doing the work to take it up. It is our duty as regular practitioners to stop the progress of the disease, as we are the first to observe it, and it is such a simple matter to cure, if treated in time. If an elevator inspector should notice a broken strand of wire cable, which jeopardized the safety of the elevator, and did not condemn it, we would censure him. A track walker who deliberately passed over a rotten tie would be equally condemned. The same criticism would be passed upon any steamship company that neglected to equip its ocean-going vessels with wireless telegraphy. And surely the same rule applies to us in constructing crowns and inserting fillings when the teeth are affected with pyorrhea and diseased gums. Many practitioners claim it is useless to attempt extensive treatment for this disease as the efforts of the most successful men give but temporary relief, and the final loss of the teeth is but a question of a short time.

It is unfortunate that this opinion prevails in the minds of so many, for it is transmitted quite frequently to those who would otherwise take up the work and make a great success of it. The successful treatment of pyorrhea demands so much from both operator and patient in time, energy and expense that many objectionable features present to discourage the beginner.

If the general practitioner considers how much time he consumed in learning to insert a gold filling, construct a bridge, or perfect himself in inlay work, it is certainly reasonable to anticipate the same expenditure of time and energy in mastering the technic of planing, or removing the deposits from roots of teeth.

One complaint is that the work is painful. Another, difficulty of positive diagnosis. Still another, patients do not appreciate the work.

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*Read before the Fort Collins Dental Society, 1914.
Drawings by R. P. McGee.

When the technic is mastered the work can be done with very little discomfort to the patient. The pain is usually due to the distention of the pocket, or to plunging the instrument into the soft tissues in the effort to remove deposits. The deposits are within the area of the pocket and by locating them carefully with an exploring instrument, it is possible to accomplish their removal without forcing the scalers into the gum tissue. Dr. F. B. Noyes told us a few years ago at Boulder, that when cleaving enamel and preparing our margins, we should form a mental picture of the structure of it. The same suggestion will apply to the root surfaces we operate upon.

If roots are denuded and sensitive it will usually be at a point that will admit of polishing. This can be done with wooden points and pumice, also with Cutter's tape which will materially reduce the sensitiveness. A solution of nitrate of silver is very effective in reducing the sensitivity but is objectionable on any exposed surfaces on account of discoloration, and gold fillings should always be protected from it. A 10-per cent. solution can be used without discoloring the teeth.

Argol and protargol, two silver salts, have been recommended for reducing sensitiveness of this character. They do not discolor but are not so effective as the nitrate. Frequently devitalization is necessary before the roots of a tooth can be thoroughly cleansed of deposit. Considerable experience is necessary to positively diagnose every case. But *experience* is necessary for success in all our work. Those who treat pyorrhea earnestly and conscientiously are doing their patients inestimable good, and the appreciation, although somewhat tardy, is almost sure to be expressed later.

The technic of removing deposits requires the same sacrifices, hard work and concentration of mind as any other work, possibly more in view of the fact that the surfaces we are operating upon are out of sight. Being dependent entirely upon the tactile sense, or in other words relying wholly upon the sensation transmitted by the instrument in passing over a surface, through our fingers, and to the brain; this particular work presents problems very different from that where the field of operation is in plain view.

STETHOSCOPE

The development of this technic is similar in may respects to the use of the stethoscope. The physician who trains his ear to the sounds produced by the air passing through the cells of the lungs soon recognizes the presence of infiltration, the presence of fluid, absence of tissue and normal function. By constant practice, concentration of mind and determination to master this method of diagnosis, many physicians become very expert in interpreting sounds through the stethoscope. In this method it is the ear and the brain which are brought into action.

Violin teachers claim that only one pupil in one hundred will make a violin player as so much depends on the technic and the ear for sound. The ear must be trained to appreciate the sounds or it is impossible by the bow and fingers to produce them. While some pupils can never acquire an ear for music the majority get discouraged early and are not willing to attempt to do so by persistent work when encouraged by the teacher. While it is a far cry between using the stethoscope or playing the violin and treating pyorrhea, there is a similarity in developing the technic, for, as we use the ears in the detection of air passing through lung tissue, and ears and fingers for music from the violin, so we use them for detecting deposits. As the fingers on the finger-board of a violin recognize their proper position and the bow transmits sensations to the fingers and to the brain, so do we in handling scalers gradually interpret the condition of root surfaces, thus recognizing by constant practice the normal smooth, or the abnormal rough, surface by sound and touch.

Eliminating the cases where we have osteoclasts and absorption of the roots, and confining the treatment to those where the roots have deposits on them, the first procedure is to locate deposits and determine the amount of process remaining for support of the teeth. The length of process is not always to be depended upon as a positive support, for in one case fully one-half of the alveolar socket may envelop the root but be so thin and flexible as to be of little support to the leverage the tooth is subjected to. Then again only one-third of the alveolus may remain but on account of its thickness and density may give excellent support. Many such cases remain ten to fifteen years and do splendid service when carefully treated, if the patient co-operates by cleansing after each meal and returns to the dentist frequently for treatment. It is of the utmost importance that the patient be impressed with the fact that in nearly all cases of long standing or where there is great destruction of tissue, the peridental membrane is destroyed for a greater or lesser depth. The gum tissue bears the same relation to the tooth in such cases as a loose rubber nipple on the neck of a bottle. For this reason frequent visits to the dentist are necessary.

Every pyorrhea pocket should be regarded as a surgical wound, but, unlike wounds in other parts of the body it is impossible to protect them against infection. As the destruction of the alveolus and soft tissue covers a considerable period, it is unreasonable to expect pockets to be obliterated immediately after our treatment.

The efforts of tongue, lips and cheeks to place food between masticating surfaces of the teeth, has a tendency to force food debris under the gum margins. The gums may have receded and present a wide margin which acts as a shelf to retain the food, and the character of the saliva may be such as to assist the accumulations in clinging to the necks of the teeth and gums tenaciously. The viscidity of saliva makes it difficult to thoroughly cleanse some mouths. The patients will apparently try to follow our advice in brushing but they do not do it skillfully until they are repeatedly shown. When they return for treatment and bring their brush, as they should be advised, in case they do not remove debris successfully, we should show them how ineffective their efforts are, and then patiently teach the power of the proper use of the brush.

Small cottonoid rolls with a mild antiseptic in their own hands will frequently enable them to see what they fail to remove on the lingual surfaces. A mouth mirror is essential for some patients for it throws responsibility upon them, and does away with the old apology, " I can not see those places next to my tongue." A surgeon carefully watches his wounds, dressing and redressing until new tissue forms and fills the wound from the bottom to the surface. We can not do this in pyorrhea but depend upon keeping the pocket absolutely clean until it is obliterated and new attachment is formed with the root. The ordinary chip syringe is invaluable as a water syringe for forcing food from between teeth, and between roots where gum has receded exposing bifurcation.

Dr. Beck has given us a combination of subnitrate of bismuth, yellow wax and vaseline, which can be used in pockets as a dressing. It is an excellent preparation, but the surgical work must be done thoroughly before using it.

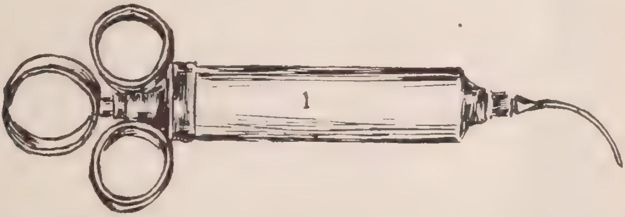
Careful watching and frequent cleansing and stimulating for a time usually develop a constricting power in the gum tissues which is surprising to patient and operator. The judgment of the operator will determine how often the patient should return for treatment. A class which is hopeless is that where the tooth upon pressure is easily pushed into the socket, and when released immediately protrudes again. It is evident that the membrane in the apical space is thickened or hypertrophied and acts as a rubber mat or cushion. Where the tooth can be twisted there is no hope, for the attachment is destroyed to too great an extent. In such cases it is fair to presume the tooth is held in place by its attachment on one side only, and a careful examination usually reveals this condition.

When the patient is willing to co-operate in thorough treatment, all hopeless teeth should be extracted. Elongated or protruding teeth which are struck by the opposing teeth, keeping the soft tissues constantly irritated, should be ground out of occlusion. Absolute rest is essential to reduce inflammation of the soft tissues and produce comfort. Patients are inclined involuntarily to play with such teeth, biting them, touching them with the finger occasionally, or pressing against them with the tongue. When ground properly, patients should be instructed to leave them alone.

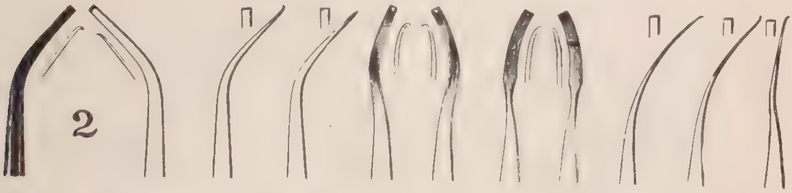
A careful examination should be made for dead pulps which if found should be treated at once. If retention is indicated it is well to retain temporarily at this time, permanently later if necessary. For temporary retention silk ligatures may be used.

Gold and silver wire composed of two-thirds silver and one-third gold is very satisfactory for retaining the lower incisors. This can be made by any manufacturing jeweler in different sizes, of suture wire. The wire loop should first extend from cuspid to cuspid, and then an additional loop between the teeth to be secured.

How frequently we hear of an individual who has had extensive treatment and finally lost his teeth. In this connection it is well to consider the number of gold and amalgam fillings, the gold and porcelain inlays, crowns and bridges that have failed. Some one has said the life of the average gold filling is three years. There is no reason to expect infallibility in pyorrhea treatment. The same conditions may present at any time which were present when the pyorrhea started, or some other condition may become operative which will produce it again. Therefore, we must watch every pocket until the tissue constricts around neck of tooth and is capable of taking care of itself, and also be assured that the patient can use the brush skillfully and keep the teeth clean.



Reducing inflammation in the surrounding tissues is much appreciated by patients before removing deposits. This is accomplished satisfactorily by washing the pockets with hot water. Use a syringe with a small point which can be inserted to the bottom of the pocket. It is the exception when the patients do not express pleasure from this method of cleansing. The hot water applied repeatedly has a very soothing effect. The additional application of the compound tincture of iodine and aconite to the gums will usually suffice for the first treatment. After a few days, removal of deposits can proceed with much less discomfort.



If one has not had the advantage of instruction with a special set of instruments, the scalers here presented have so many excellent features that they are recommended (Thompkins 1-2-3-4-5-6). The shanks are narrow and thin which permits entrance into pockets without distending the soft tissues. The cutting blade is so shaped that it cuts with the push or pull motion. The curve of shanks of 5 and 6 permits of considerable range of movement, and the instruments will cut upon concave as well as upon convex surfaces. As all instruments for this work soon lose their edge, it is a great advantage to feel that these can be sharpened with very little effort. A few strokes across the surface of an Arkansas stone will produce an edge equal to a new instrument, so with a little care the cutting blade may last indefinitely. As these instruments are made for conesocket handles, it is possible to have a good supply on hand at nominal expense.

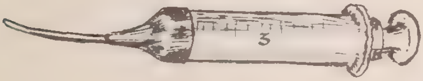
If the operator will place the cutting point upon his thumb nail and gently draw the instrument over the nail, endeavoring always to follow the curve of the surface, he will at once grasp the power or the capability of the instrument in working on a convex surface. The right hand must adjust the cutting blade to follow curve of root surface. The same wrist motion is necessary when the instrument is used with the pushing force. The size, the shapes, the usual temper of these instruments and their range of cutting power, or the apparently inaccessible surfaces that can be reached by them, is a surprise when the operator gets accustomed to their use. The delicacy of construction prevents in a great measure the pain from distending pockets and to the beginner as well as his patient, this is of great importance. Wide blades and long shanks can be used satisfactorily as soon as one gets accustomed to them, but for the beginner they seem clumsy and much more difficult to manipulate. To use them without considerable experience in the work has a tendency to jeopardize the pleasant relation or the confidence between patient and operator. The use of these instruments certainly prepares one for the new forms of planing instruments.

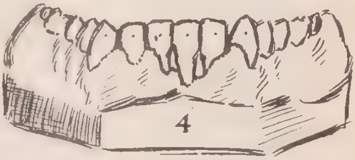
If the work is painful a local anesthetic becomes necessary. In view of the susceptibility of many people to cocain poisoning, instead of injecting into gum it is better to apply cocain in the pockets. On the principle that it is policy to hold fast to that which is good, the writer has used the following preparation for many years, a formula of Dr. J. E. Cravens: To a half ounce of Squibbs' chloroform add freshly-pulverized hydrochlorate of cocain, waiting after each addition of the alkaloid until the solution is clear. To this solution add six to eight drops each of oil of cloves, cassia, and menthol, and to this add ten drops of Mary Stuart Extract or White Rose perfume to make it agreeable. This will make an 8 per cent. solution of cocain. With cotton rolls placed buccally and lingually, the pocket is freed from excessive moisture by using a wisp of cotton on a smooth probe. A little butter dish is an excellent receptacle for the cocain solution. With another smooth probe and wisp of cotton the cocain solution is placed in the pocket, or as many as indicated, and allowed to remain for two or three minutes. The chloroform facilitates absorption and the quantity necessary to produce an anesthetic effect is very small.

By confining our work to three or four teeth at each sitting the danger from cocain is reduced to the minimum. Acestoria, which is not a secret preparation, has also been used very successfully in this work. As we remove the deposits and plane or smooth the root surfaces, the pockets should be washed frequently with hot water, and this must be done with considerable force and with syringe point deep in pockets, but not sufficiently so to cause pain, to remove the small particles of deposit.

The next procedure is polishing accessible root surfaces and necks of the teeth which is best accomplished with Cutter's tape and powdered pumice, also wooden points in a suitable holder as suggested by Dr. F. H. Skinner. This is most important and while it requires time, the polishing more than repays for the effort. Tiny granules and rough surfaces which may escape the instrument are eliminated in this way. After again washing the pockets thoroughly to remove all traces of pumice, the application of an acid is indicated.

Every pus pocket is supposed to be lined with a pyogenic membrane, which is a mucous surface, consequently an excretory surface, and to dispose of this, destroy all micro-organisms and stimulate the formation of new granulations, several acids are recommended, any one of which will answer: pure commercial lactic slightly heated, 15 per cent. trichloracetic, 10 per cent. sulphuric, or 25 per cent. phenol sulphonic. If the root has been properly scaled and the pocket washed, one application of the acid is usually sufficient. If pus is present upon the next visit of patient, we will find our instrumentation is at fault and it will be necessary to again plane or smooth the root. Some slight granule or rough point will be found to cause the continuation of the trouble.





Repeated application of the acid will produce sensitiveness of the teeth and destroy granulations already formed. It is, therefore, imperative that thorough instrumentation be accomplished. Dr. Younger has always maintained that if roots are free of deposits, the sockets properly irrigated, the gums will assume a healthy pink hue. We cannot rely upon any local application to cure pyorrhea as yet. In applying acid to the pockets, gum tissue adjacent should be covered with oleo serate of zinc, cotton rolls placed to absorb any excess of acid when placed in the pockets with syringe. A suitable syringe is a prerequisite.

Antidotes should be kept convenient lime water and bicarbonate of soda. Some patients are very susceptible to nervous impressions, and a small amount of acid getting in the throat will cause some fright and uneasiness. The use of an antidote will dispel this almost immediately. After application of acid it is advisable to leave the tissues absolutely alone for eight days, that nature may have an opportunity of setting up a reconstructive process. At next sitting if trouble still exists we can decide whether it is due to a failure to remove all deposits, or to food forced into the pockets.

On account of the limited strength of the acids permissible in the mouth, much difference of opinion exists as to their power to dissolve deposits to such an extent as to make their removal less difficult.

The writer for several years has been depending upon instrumentation and thoroughly irrigating pockets, except in those cases where there is great destruction of process, and the need of a powerful stimulant and solvent to separate or smooth small spiculæ of necrosed process, believing the fluids exuded from the tissues after washing the pockets contain the elements for constructing new tissue to fill them.

Interference of any kind retards the reconstructive efforts of nature. This is in accord with modern surgical methods where the more powerful antiseptics are no longer used, but dependence placed upon thorough drainage and cleanliness.

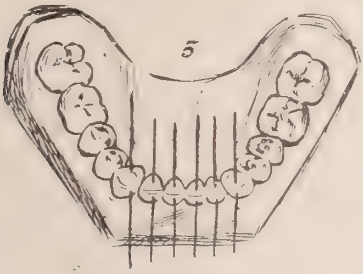
Some time ago a practitioner who has specialized in pyorrhea for at least eighteen years said he could do with six instruments what any other dentist could do with a hundred. Had this gentleman not been one of the most successful in this particular work, and the writer not familiar with his work, there would be some grounds for taking the statement with allowance. The statement was not made in the spirit of egotism, but to show what could be done with a few well-selected instruments. It is simply a sign board, as it were, pointing to the fact that it is not always the number of instruments we have, but the power to use properly the few at our disposal and appreciate their possibilities.

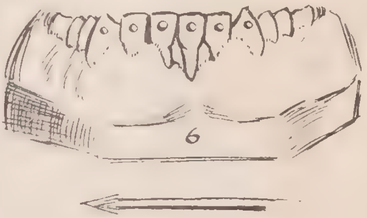
While most of us require more than six it is confidently believed that the less number we use to begin with, providing they are well selected and adapted, the less confusing they will be, and we will develop skill in removing deposits more rapidly. In this connection it is well to mention the old story of Dr. W. H. Atkinson: While giving a clinic, the insertion of a gold filling, many years ago in New York, some dentist glancing over the doctor's instruments said, the doctor overhearing it, "Any dentist could put in a filling with that set of instruments." Instantly Dr. Atkinson said, "Come around to-morrow morning and I will give another clinic." At that time the doctor used a spoon excavator, broke down the enamel of an approximal cavity in a bicuspid, prepared the cavity, and finally broke off the point of the excavator, converting the instrument into a gold plugger, and inserted the gold filling with it. The absolute truth of the story cannot be vouched for, but we can all learn a lesson from it.

As one gains experience he recognizes that the healing power is in the tissues and that surgical work, combined with cleanliness, fixing loose teeth, massage, stimulating tissues with use of brush and bringing teeth into active service are the essential points to remember. Before massaging is advised, it is well to be absolutely sure of deposits being removed, for if not, the pressure and rubbing of gum tissue over a rough surface will continue the irritation.

To give you an idea of the various forms of instruments which have been used during the past twenty-five years the following sets are presented. Those of Doctors Harlan, Allport, Cravens, Younger, Younger Good, Smith, and a later set by Dr. Younger. As these instruments were designed and used successfully by men who have given pyorrhea a life study and who have had enviable reputations, it emphasizes the fact that it is not always the number or one particular form, but the selection of a few that are applicable and our developing the ability to use them. The Carr instruments are also shown illustrating the latest ideas in planing and smoothing roots.

The Bryant system for replacing broken facings in bridgework is of inestimable value in constructing a permanent retainer for the lower anterior teeth. The writer is indebted to Dr. E. R. Vaughn, of Denver, and Dr. E. A. Bryant, of Washington, for its application in this way. Holes are drilled labio-lingually through the teeth for the wire which must be the size for the Bryant nut system. The hole for wire in each tooth is most easily started with a 33½ inverted cone bur as it takes hold (Fig. 4) and is less liable to slip on the enamel.





When the dentine is reached a No. ½ round bur is used to penetrate the remainder of the tooth, then a No. 1 to enlarge, permitting the free passage of wire. Starting with a cuspid the direction of hole drilled in this tooth should establish direction of the others. By placing a section of wire in the hole permitting its ends to extend labially and lingually, it acts as a positive guide for drilling the hole in adjoining tooth. When this is completed a section of wire is placed in the same manner. The six teeth drilled with sections of wire will present as Fig. 5 all passing through teeth in exactly the same direction. For this purpose German silver will answer.

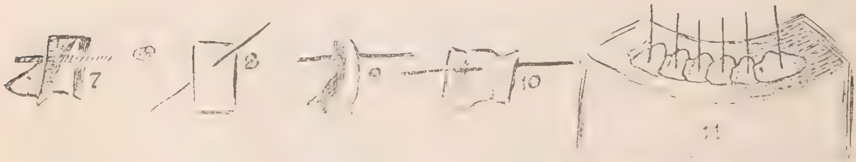
The holes on labial surface should be countersunk with the drill (Fig. 6) to receive nuts, and slightly on lingual surface to permit of easy entrance for each wire.

Pure gold plate 36-gauge is used for backing, and platino-iridium wire, preferably 25 per cent. iridium, for pins or wires of retainer.

Wire to labial of each backing should be threaded with taps. (Fig. 7.) The proper length pin is passed through the backing (Fig. 8) and soldered with the most minute shaving of solder; an excess will stiffen backing and prevent perfect adaptation in burnishing. The flat backing with pin soldered in is placed upon the lingual surface of the tooth, the pin extending through the drill hole. Then burnish until a satisfactory adaptation is obtained. (Fig. 9.)

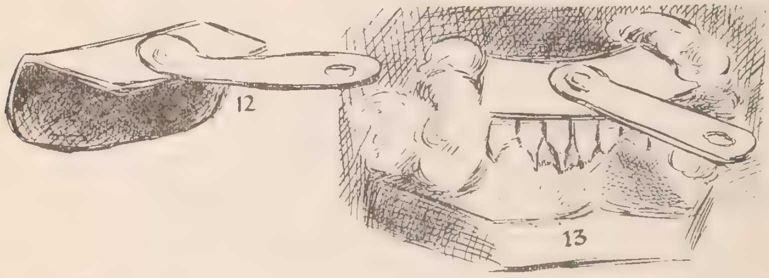
If we begin with the left cuspid, the pin and backing are put in place and the nut screwed home which holds the trimmed and burnished backing in place for a final burnishing.

The backing with pin for lateral and each succeeding tooth is prepared in same manner with the exception of a lap being preferable as each backing is adapted. The lateral backing should extend onto the cuspid backing slightly, the central backing onto the lateral and so on for remainder. (Fig. 11.)



The lapping in no way interferes with the perfect adaptation of the thin pure gold, and in the final soldering the solder has no tendency to flow beneath the backings. In other words the solder, with ordinary precautions, will flow only on lingual surface of completed retainer, which is of the greatest importance.

When all of the backings and pins are in place, the nuts screwed home and final burnishing completed, the impression is taken with an ordinary bridge cup, one wall lip or apron of which is removed. (Fig. 12.) No plaster should be permitted to flow over labial surfaces of the teeth. The long extension lingually of pins catching in the plaster, and the fact that they are all straight assures easy removal and accuracy. (Fig. 13.)



The nuts are removed while plaster is setting, and as each nut is removed it is well to place it and the others conveniently so they can be replaced upon the same pins. It is worth a great deal to know that each nut has worked satisfactorily and will do so again, especially when the time for placing them is limited.

The impression is removed and model run, and the usual precautions taken in heating and soldering. A liberal quantity of solder should be used to insure strength and rigidity. (Fig. 14.)

When the case is removed from investment the lingual extension of each wire is cut off and the necessary grinding and polishing completed. If the retainer goes to place it is ready for the final cementing, after the labial extensions of pins are cut so they extend about one-eighth of an inch beyond labial surfaces of the teeth. This is merely for convenience and to avoid loss of time in placing nuts finally. Being assured of a perfect fit, the teeth are protected with cottonoid rolls, the lingual surfaces and pin holes bathed with alcohol and thoroughly desiccated. A slow-setting cement is preferable as it affords plenty of time for placing it in pin holes and adjusting the nuts. As soon as cement has set the pins and nuts can be ground and polished even with the labial surfaces of teeth appearing as small gold fillings. (Fig. 15.)

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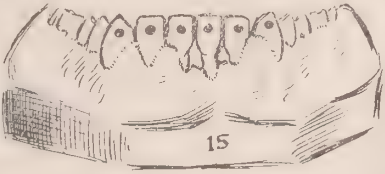
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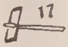
In case a pin is out of line and prevents the finished piece from going to place, it can be cut off and a hole drilled through backing following direction of pin removed. (Fig. 16.)

Another piece of wire is selected and threaded with taps. This is passed through a small disk of 36 pure gold plate and the two soldered with the most minute shaving of solder. (Fig. 17.)

The drilled hole for pin should be countersunk on lingual and the pin passed through, drawing the pure gold into the countersunk cavity, molding it to the form of a cone. (Fig. 18.) A little solder flowed into the opening or funnel around pin makes it correspond to the nut in shape, when finished. (Fig. 19.)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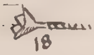
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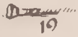
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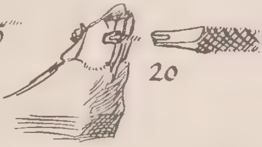
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The Bryant nut can be utilized and soldered to lingual end of pin accomplishing same results. The labial extremity of pin is threaded to receive nut. When retainer is cemented, this separate pin will pass through retainer and tooth, serving its purpose as well as if it were soldered in retainer and can be finished smoothly on lingual as the nuts are ground and polished on the labial surfaces. (Fig. 20.)

The system enables one to force the loose teeth firmly against retainer and hold them while cement is setting. One or more missing teeth can be replaced by this method combining the features of retainer and bridgework.

502 California Bldg.

TREATMENT OF LOOSE TEETH DUE TO INFLAMMATORY DEGENERATION OF THE GUMS AND ALVEOLAR PROCESS*

BY JOSEPH HEAD, M.D., D.D.S., PHILADELPHIA

THE DISEASE OF PYORRHEA ALVEOLARIS, in spite of its name, is not always associated with a flow of pus from the infected tooth-sockets. As a matter of fact, pus does not appear in 25 per cent. of the cases. The main symptoms are inflammation of the peridental membrane, bleeding of the gums at the slightest touch and a tendency for the teeth to elongate and be sensitive to mastication. Finally, the gums separate from the roots of the teeth, forming pockets in which salivary calculus and infection cause such centers of irritation and disintegration that the destruction of the teeth involved is only a question of time unless the tartar is removed from the roots, the mass of infection destroyed and the gums stimulated to reattach themselves to the roots of the teeth.

A single blind fistula from an infected root may cause the most profound nervous depression, which, being chronic, will be recognized only by its disappearance with the cure of fistula.

Osler, Goadby, Daland, Hunter and Billings, I believe, have not overstated the bodily ailments that time will show to be directly traced to mouth infections. That mouth infection is, in a great majority of cases, associated with Bright's disease, diabetes, cardiac, hepatic, renal and stomach disorders has been noted for a long time, but within recent years it has been shown that these disorders are, in many instances, ameliorated and, at times, entirely eradicated by the removal of the infecting foci from the mouth. My experience in the treatment of pyorrhea alveolaris with its associated tooth infections accords with these findings.

The development of medical science has now placed on the dentist not only primarily the repair and restoration of the teeth that they may look well and give efficient power of mastication, but the responsibility of deciding whether or not patients shall be inflicted with a long list of diseases that owe their origin and existence to infections within the teeth and the adjacent tissues. This question of autotoxemia has been a great shock to the prejudice of the medical world at large, but to the dental world, trained more along purely mechanical lines, with little or no bacterial knowledge, the question of autotoxemia is no less than revolutionary. It is as though cabin-boys had suddenly awakened to find that they had been steering the ships of the human fleet without charts or knowledge of navigation, over rocks, whirlpools and mines, all the time blaming unavoidable fate for the death and disaster, when

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*Read in the Section on Stomatology, of the American Medical Association, of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with the *Jour. Amer. Med. Asso.*

the wrecks, deaths and disasters were directly caused by their own well-meaning, blundering hands. The medical world at large cannot escape this indictment, but dentistry, inasmuch as she recommends appliances and fixtures that cannot be cleansed, that obviously may cause and perpetuate toxemia, is overwhelmed by the contemplation of the long lists of preventable diseases and the gruesome toll of deaths that her well-meant efforts may have unwittingly occasioned. The manifestly undisputed fact that the removal of non-cleansable crowns and bridges have caused the rapid disappearance of heart murmurs, violent nervous derangements, duodenal ulcer, anemia, etc., is a convincing proof of what wholesale disease had been caused by the mechanical appliances now generally recommended.

Dr. William Hunter[1] did not overestimate the danger associated with these appliances and methods. In the light of our present knowledge any dentist who puts in a bridge or crown that cannot be cleansed as thoroughly as any one of the natural teeth, or knowingly allows foci of infection to continue in the gums or root canals, is endangering the health and life of his patients, and I have no doubt that such procedure in the near future will be accounted malpractice. To be sure that there are no infecting foci, however, requires a discrimination that taxes the ability of the trained, conscientious dentist to the utmost. One canal of a molar pulp may have died, spreading infection throughout the system, while the rest of the pulp, being alive, may cause the tooth to appear normal. Pulps under fillings, although alive, may have become infected from the decay prior to its removal and so cause a fistula, open or concealed, that on account of the living infected pulp is difficult to diagnosticate. Again, in case pulps have died and have been removed from teeth, especially molars, it is a matter of great nicety to be sure that all the root canals are filled so as to be free from toxemia-spreading infection. Roentgenoscopy is of great diagnostic value in these cases, but even with the Roentgen ray these are difficulties which will always require nice discrimination and judgment. There is no excuse, however, for allowing obvious fistulas to continue to discharge their contents into the mouth or blood-current. The loss of a tooth or two in comparison to the evil of such a condition is not to be considered; but as a matter of fact, any conscientious, trained dentist knows that ninety-nine out of a hundred of the abscesses and fistulas can be readily cured without the loss of any teeth.

When we come to pyorrhea and pyorrhea pockets, which the great majority of dentists class as incurable, we have come to the great divide, for those dentists who shall control and cure this great scourge shall take their places in the dentistry of the future, and those who neglect this important source of human disease shall be relegated to the spheres of those who unwisely attempted that which they were unfitted to accomplish; for the cure of pyorrhea alveolaris has been more or less successfully accomplished for the last fifteen or twenty years.

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[1] Hunter, William: Oral Sepsis, Lancet; London, Jan. 14, 1911, p. 79.

While, as previously stated, pyorrhea is associated with various disturbances of which it may be the primal and continuing cause, such as gout, Bright's disease, diabetes and cardiac, hepatic and renal disorders, such specific disease as syphilis, gonorrhea and tuberculosis, by their debilitating effect on the tissues of the mouth, may so lower the vitality of the gums that infections that otherwise would be repudiated, penetrate the peridental membrane and by a subtle toxemia still further depress the general vital forces. This infection having penetrated the gums, forms a small abscess that partly strips away the peridental membrane from the tooth-neck, forming a pocket, which once formed continues the disease even after the general systemic disorder may have been conquered. It is probable that some one of the numerous passing diseases, such as typhoid, measles, grip, or even a bad cold, has temporarily lowered the physical resistance of the gum tissue to the point of permitting the ever-present infection to penetrate and form the self-perpetuating pockets, thus leaving the pyorrhea to continue without apparent systemic cause.

If the systemic cause has passed and the pyorrhea has not created a new one, the disease may perhaps be successfully treated by local means and a permanent cure hoped for; but if the pyorrhea is associated with serious general disorder, local treatment, important as it is, can be held only as a palliative and must be supplemented by judicious systemic treatment. The most important systemic treatment in the cure of pyorrhea consists in the discriminating use of vaccines that will produce antibodies in the blood as supplementary adjuncts to the proper local treatment; and yet, important and valuable as the vaccine treatment unquestionably is, without the proper local treatment that removes infecting foci and stimulates the gums to heal and reattach themselves to the roots, vaccine treatment can only reduce the severity of the symptoms; it cannot effect a cure.

About seven years ago it was my good fortune to discover that commercial hydrofluoric acid would disintegrate tartar with no macroscopic action on either cementum or enamel of an extracted tooth. The poisonous action of this acid precluded its use as a therapeutic agent to be applied to the gums. Through an extensive series of experimentation it was proved that a 23 per cent. solution of ammonium bifluorid (an acid salt of hydrofluoric acid) will disintegrate the tartar on a tooth as readily as hydrofluoric acid itself and also leave the tooth apparently unsoftened. The following is a safe, practical method for its manufacture: Twenty grams C. P. ammonium bifluoride salt should be put into a wax bottle, 10 grams C. P. hydrofluoric acid should be added and the whole filled up with water to the volume of 100 c. c. This will make a mixture of ammonium bifluoride 20 per cent., free hydrofluoric acid 10 per cent. and the rest water which is the solution desired.

The solution of ammonium bifluorid may be injected once or twice a week into pockets around loose teeth, but care must be taken not to inject it into fresh cuts, as such procedure would cause great pain. The patient should spit without rinsing the mouth with water, the saliva acting as a protection against irritation. After one or two injections the soreness and inflammation will largely disappear, and even the general symptoms of toxemia will sometimes be found to have abated. The tartar scale that could not be easily and painlessly removed at the first two treatments will now tend to be so loosened that its thorough removal by scalers will be easy for both patient and dentist. After four or five applications, one week apart, black scales that have escaped the instruments will sometimes be found floating loose in the pockets, so that they can readily be picked out; finally, the root will become as smooth as velvet to the touch of the instrument. When this stage has been reached it will be found that the scalers cannot be so deeply carried into the pyorrhea pockets as was easily possible in the beginning. To do so causes pain and a free flow of blood. This indicates that new granulations are forming, which should not be ruthlessly broken up either by instrumentation or by injection of the bifluorid into them. Once each week the solution should be allowed to flow gently into the pockets, a procedure which results in continuous healing and is not productive of pain. Careful exploration for tartar on the root within the pocket is always advisable. Reattachment of the gum to the root, however, can be accepted as assurance that that portion of the root has been thoroughly cleansed. The scaling in that place should then be discontinued, while the weekly application of the bifluorid alone should be used. If, however, at the end of two or three months any of the pockets have not entirely healed they should be re-explored with scalers and the treatment repeated as for a new case, although by this time most of the original pockets will have disappeared, and where they existed the gums, with a slight contraction at the neck, will be found firmly adherent to the tooth. Teeth that have lost more than half of their gum attachment have become, under this treatment, firm and comfortable to the action of normal mastication.

Let us now consider some of the other means of local treatment in the cure of pyorrhea alveolaris. Loose teeth may be splinted together so as to give immobility, but this should always be done in such a manner as not to prevent thorough cleansing of the gum around their necks. Any malocclusion should be remedied so that loose teeth may be relieved of the excessive pressure of mastication due to thickening of the inflamed peridental membrane. When a pocket has approached an apical foramen near enough to infect the pulp, the pulp should be destroyed and the root canals thoroughly sterilized and filled. This should be especially looked to in the case of molars in which the pocket extends through the bifurcation and down to the tip of one of the roots. It is sometimes excellent practice to cut the crown midway through the grinding surface through the juncture of the roots, finally extracting the diseased root with its side to the crown. This exposes the other root or roots so that they can be filled and cleansed as easily as a bicuspid. With upper molars, if the palatal root is necrosed, this operation is most satisfactory as it leaves the mouth, to all appearances, unchanged, and works for greater stability and more rapid recovery by not forcing the remaining root or roots to stand more than their fair share of mastication.

An excellent mouth-wash for use at home consists of a saturated aqueous solution of sodium silicofluorid which amounts to a 0.61 per cent. solution. This, when held for a minute in the mouth, morning and evening, and freely swashed for at least a minute through the teeth, is a great assistant in relieving inflammation of the gums. Like the bifluorid, it seems to restrain the deposition of tartar on the teeth, except in about 1 per cent. of cases, in which it seems to increase it slightly. But even in these cases the gums heal promptly and the superficial deposit is easily removed from the teeth with brush and pumice. The disagreeable flavor of the solution can be disguised by adding an equal amount of sodium chlorid or a judicious quantity of aromatics.

An efficient tooth-powder that will liberate enough free oxygen to make from 40 to 50 drops of a 3 per cent. peroxid solution for every 10 grains used on the brush in the mouth is as follows:

Magnesium peroxid (200 mesh sieve)	60 parts
Sodium perborate	30 parts
Castile soap and flavoring	10 parts

This *can* be used morning and evening for brushing the teeth and should be swashed around the interstices for a full minute before being ejected from the mouth. Without thorough cleansing and brushing of teeth and gums morning and evening antiseptic washes will be of no avail. Since the tooth-brush cannot cleanse between the teeth these surfaces should be swept free from bacterial deposits with floss-silk morning and evening, and the teeth and gums thoroughly brushed with strokes not less than an inch and a half long, and rotary wherever possible. The brush should be small, not over an inch and a half long, the bristles not over a quarter of an inch, and narrow, so that when the mouth is partly opened the brush can be placed between the ramus of the jaw and the third molars. Most brushing does not extend beyond the spring of the bristles, which instead of giving bristle friction merely pivots the bristles without cleansing. The upper and lower third molars more frequently decay and are subject to pyorrhea alveolaris simply because they are not cleansed. Structurally, they are not weaker than any other teeth. At each visit of a patient it is most essential that the necks of all the teeth be examined for bacterial plaques that may have been accumulating undisturbed since the last visit. The patient should be shown what movements of the brush are necessary for their removal, for a final test of a method of brushing the teeth and gums is, Does it clean away the bacterial plaques? Ninety-nine out of a hundred cleanly people never brush the thick bacterial plaques from their third molars, or, as a matter of fact, from half the other teeth, simply because they have never been taught how. Gums as well as teeth should be thoroughly brushed twice a day of all bacterial plaques. Observation on my patients proves that healthy gums are no more injured by vigorous brushing than is the skin adjacent to the finger-nails. Inflamed soft gums will unquestionably be made sore for the first week or two, but persistence on the part of the patient and assistance on the part of the dentist in touching up the sore spots with silver nitrate will soon strengthen the gums to almost any friction the tooth-brush can give them. The question of vigorous cleansing and massaging the gums with the brush is not only a question of removing external films of infection, but is also for the purpose of producing an auto-inoculation that will create antibodies in the blood for the purpose of combating the disease, a vigorous massage of the parts causing a local hyperemia, which enables the antibodies in the blood to come into more intimate contact with the infecting bacteria. This is a most important phase in the cure of pyorrhea, and one that has not been sufficiently emphasized. The formation of antibodies for the cure of pyorrhea is a means of eradicating pyorrhea from the system The auto-inoculation caused by vigorous gum brushing combined with the judicious use of carefully prepared vaccines have given results of a systemic improvement that are little less than marvelous.

Medical literature is so full of the reports on successful vaccine treatment for mouth infection that they cannot but convince the most skeptical that there must be value in the treatment. Goadby's work in this field is deserving of great credit. Cummins[2] has published a recent article on this subject wherein Goadby's methods are followed. The work of Leary and his associates is more in accordance with modern bacteriologic methods, however, and their reports are more in accord with the bacterial findings of this paper.

About two years ago I began the vaccine treatment as an adjunct to my local pyorrhea treatment. I was decidedly skeptical because pyorrhea does not seem to be caused by a specific bacterium, but may be caused by any one of several species, or various combinations of these. Nevertheless, from the very start such increased improvement locally and systemically was obtained that the great value of the treatment could not be doubted. The results in almost every case showed a consistent healing of the pockets and a disappearance of infection from the gums. In about 50 per cent. of the cases there was a distinct improvement in the general physical condition, which, as before stated, being chronic, was sometimes made more apparent by its absence than its presence. In the forty cases that are used as the basis of this report, the streptococcus, staphylococcus, *Bacillus influenzae,* pneumococcus, *Micrococcus catarrhalis,* diphtheroids, Friedländer bacillus and an occasional unidentified bacterium were used in the vaccines. The *Streptococcus viridans* appeared in about 25 per cent. of the cases. That the vaccines for pyorrhea alveolaris for forty cases contained such a consistent combination of similar germs for so many cases with so comparatively few unidentified strains may be partly due to the method used in collecting the specimens so as to exclude the incidental or extraneous flora of the mouth. My method will now be described.

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[2] Cummins, R. C.: Jour. Vaccine Therap., March, 1913, p. 59.

When the infected area appeared at the tip of a root in which the pulp had died and the root canal had been filled, the culture was always taken through the root canal, which was drilled out with a fine sterilized piano-wire drill until the end was nearly reached. The canal was then sterilized with phenol (carbolic acid), wiped dry with cotton and then blown out with hot air. When this had been accomplished and the tooth had been carefully guarded with a napkin to prevent infection from the mouth, another sterilized drill was passed down to the end and then plunged through the tip into the infected area. This was then streaked over the blood-agar in the ordinary manner. At times, however, the infected area appeared near the tip of a root or roots in which the pulps were alive. In this case the root-canal method of obtaining the specimen was not feasible, so the following method was substituted: The mucous membrane over the indurated infected spot was cocainized and a thin cautery plunged down to the bone. A sterilized bone-drill was then passed through the outer plate of the alveolar process and the patient dismissed for two days. On his return the opening in the gum, on being protected with a napkin, was cauterized with pure phenol and then wiped dry. Then the sterilized point of a small sterilized platinum-pointed glass syringe or platinum spear was inserted into the bony opening made previously by the drill, and a small drop of bloody fluid extracted, which, with due care, was transferred to the blood-agar medium. This material was supposed to contain the bacteria that had gathered for the purpose of preventing reorganization of the tissues.

To take a specimen from a pyorrhea pocket the following method was used: The neck of the tooth was first carefully washed with 95 per cent. alcohol so as to remove all outside bacteria as much as possible. The tooth was protected from mouth infection by a napkin, and then a small cup-shaped spear of thin platinum was heated to a cherry red and plunged to the bottom of the pocket. Such a procedure it was thought would get not only the pus but also a slight amount of blood from the walls of the cavity. It was thought that the hot platinum would kill any extraneous flora, while the cooled metal would carry to the blood-agar only the germs directly responsible for the disease in question. It must not be forgotten that pus is sometimes sterile, while the true cause of infection may lurk within the wall of the abscess from which the material is being obtained.

The vaccines were then made up so as to contain all the germs found, except the spore formers and the anærobes that were not grown. While the bacteria of these classes may sometimes play a role in the infection the results of vaccine treatment indicate that in these cases their role is a minor one. The staphylococci were made to give 300 million to the cubic centimeter. Streptococci, diphtheroids, pneumococci, *Micrococcus catarrhalis*, *Bacillus influenzae* and unclassified bacteria were put in so that each would show 50 million to the cubic centimeter. In ordinary cases of chronic pyorrhea the initial dose is 75 million staphylococci and 12 million of each of the other bacteria, and the dose is steadily raised according to the reaction at the site of inoculation and the general systemic response. If the patient showed exceptional frailness or the inflammation was exceptionally acute, the initial dose was reduced to 37 million staphylococci and 6 million of each of the other bacteria. These doses were generally given a week apart in the arm, or, in thin patients, in the back.

I have not used the opsonic index in the treatment of pyorrhea alveolaris. I feel that clinical symptoms have been a sufficient guide. An interesting observation which I have not seen mentioned elsewhere is the occasional persistence of the induration which forms at the point of injection. It has appeared to me that this can be due only to a lack of digestion and absorption of the bacterial bodies. So long as the induration markedly persists we have an indication that the potentialities of the vaccine injection have not been exhausted. Therefore, further injections may be temporarily withheld or smaller doses given while absorption in the seats of induration is stimulated by massage. This method gives excellent results, and tends to minimize the danger pointed out by Allen,[3] when excessive reaction is caused by doses which may have been perfectly well borne on several previous occasions. As Allen says, however, it should always be borne in mind that, if the systemic reaction lasts over twenty-four hours, it is wise to increase the interval between the doses, and a larger dose should not be given especially if the patient makes good progress on the smaller dose.

If there is a tendency to the rapid formation of creamy tartar deposits on the teeth prior to vaccine treatment, it will be noted that, as the antibodies are formed and the gums show signs of healing, the tartar will be deposited much less rapidly and that the tartar deposited is of a more solid, removable nature and does not tend to burrow under the gum margins. This change in the deposition of tartar I have finally come to regard as a distinct symptom of the successful progress of the vaccine inoculations.

When a pyorrhea pocket shows sudden signs of inflammation during treatment it is always wise to open it surgically with a drill along the root to be sure that there is no back-pressure of pus, and that the antibodies have full opportunity to enter the seat of infection for the purpose of aiding in the cure: for above all things it should be remembered that the vaccine treatment can be successful only when accompanied by judicious local treatment of a surgical and therapeutic character. This applies to all foci of infection, whether in the gums or in the impaction of a bowel or anywhere else in the system. It is imperative, therefore, that there should be sympathetic co-operation with the family physician, whose intimate knowledge of the patient and whose careful diagnosis of foci of infection other than those found in the mouth will greatly increase the percentage of successes and add to the permanence of the cures.

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[3] Allen: Vaccine Therapy and Opsonic Index, Blakiston, Philadelphia, 1913, p. 112.

Allen[3] speaks of the value of citric acid in 30-grain doses three times a day for the purpose of softening the lymph-wall around the foci of infection by reducing the agglutinative power of the blood. I have found this treatment of service, but give it in the form of an ounce of lemon juice three times a day, which is the equivalent of about 34 grains of citric acid.

I shall now report a few detailed cases:

CASES 1 AND 2.—A young man with pronounced pyorrhea and several fistulas in the gums came to me so despondent that he thought he was going to die. Local treatment caused improvement, but two of the fistulas would not heal. An autogenous vaccine was made in March, 1912, from material obtained from the worst fistula. It contained only a single strain of streptococcus. After four injections, a week apart, the patient gained in weight and then started slowly to lose weight, but as he felt better and the gums improved, the treatment was continued until June, when there was a great improvement in the gums and both fistulas had healed. In the fall the patient returned and, as he and his family physician said that the vaccine had done him so much good, I made another vaccine from a small pyorrhea pocket and obtained four strains of streptococci and a *Staphylococcus aureus.* This treatment caused a complete healing of the mouth so that it was apparently absolutely healthy; the patient's skin cleared, he gained weight and felt, as he said, well. The mixed vaccine seemed most effective.

He begged me to give the vaccine treatment to his wife, who also was suffering from pyorrhea. She had almost the same experience, except she did not gain weight (her weight was normal), but her mouth showed great improvement and she slept better and felt a great lessening of nerve tension.

CASE 3.—A young woman was vaccinated with a Gram-negative bacillus, fifty million to the cubic centimeter, with some improvement, but not marked. Later a second vaccine was made of *Staphylococcus aureus* and *S. albus.* The gums showed marked improvement, but the soreness around two or three teeth still persisted; the skin generally, from being itchy and showing a tendency to pimples, cleared up and, to her great delight, remained sightly and comfortable.

CASE 4.—Mrs. A., aged about 50, came to me with all the teeth loose, complaining of great fatigue, trouble with the eyes, constipation and a steady loss of weight. In six months the vaccine treatment had markedly tightened the teeth and her chronic fatigue and constipation were gone: the wrinkles vanished from her skin owing to an increase of weight from 115 to 127. Her eyes, she says, were so improved that she could readily read what before was impossible or accomplished with difficulty.

CASE 5.—A married woman, aged 40, who had been under my local treatment for about two years, took a vaccine last fall composed of a streptococcus. She had a complexion covered with red patches, gout in the right eye, hemoglobin 67 and great depression with constant fatigue. In six months the hemoglobin went up to 93, the gout disappeared from the eye, her complexion cleared and the gums made more progress than had previously been made in two years under local treatment. Her greatest satisfaction lay in the fact that she slept well, which, prior to the vaccine, had not been the case.

In three cases as the gums and abscesses healed marked redness of the nose disappeared. This was associated with great clearing of the complexion and a gain in weight. In other cases there was a consistent healing of the gums that seemed much more rapid than that usually obtained from local treatment alone, but with many of them the time is too short to be sure of a permanence in cure.

In one case that refused to yield either to local or vaccine treatment a tumor of the breast was discovered. Such a depressing focus was obviously a sufficient reason for the poor results obtained, and as the patient refuses to have an operation the prognosis is not good.

Vaccine treatment judiciously used seems to be so valuable in the cases of pyorrhea that it should, in my opinion, always be given a fair trial and always in sympathetic co-operation with the family physician.

1500 Locust Street.

ABSTRACT OF DISCUSSION

Dr. Thomas B. Hartzell, Minneapolis, Minn.: We sometimes cause deeper infection and greater disturbance, if treatment of the mouth is undertaken immediately prior to operation in other parts of the body. I am convinced that I have been responsible for bringing about two or three cases of pneumonia by disturbing areas of granulation tissue around teeth that needed care. Dr. Mayo, in a recent conversation, confirmed the idea that operative interference in mouths to clear them of bacteria immediately preceding great surgical operations, is an unsafe procedure. Treatment of the mouth should be accomplished by satisfactory measures two or three weeks before any extensive surgical operation is undertaken.

I believe that the bacterial vaccines should be used in conjunction with other measures, and that if used properly they have a vast field of usefulness.

Dr. Thomas L. Gilmer, Chicago: Referring to the benefit derived from antiseptic mouth-washes, I suspect that the mechanical cleansing of the teeth rather than the destruction of the bacteria by the medicament caused the improvement indicated. Bacteria are not destroyed by any germicide that I know of which is not also injurious to the mucosa of the mouth. Dr. Black recommends the use of a bulb-syringe with a moderately small nozzle for cleansing the interproximal spaces, especially when the gum septum is much destroyed by pyorrhea or otherwise. If considerable force is applied to the bulb, food and other debris is dislodged. This should be used only as an adjunct to the brush, silk floss and toothpick.

Dr. C. H. Oakman, Detroit: I am glad to know that those who spoke of vaccines do not hold to the use of vaccines alone, but believe in instrumentation. Dr. Head spoke about the use of peroxid of hydrogen. Three per cent. peroxid of hydrogen should not be condemned, but, as a rule, peroxid of hydrogen used in the mouth in stronger solution would be contra-indicated unless combined with lime-water or some other alkaline agent. I saw two patients in the hospital who were suffering from so-called rheumatism which involved principally the joints of the hands, wrists and elbows. Both had pyorrhea alveolaris combined with alveolar abscesses. One patient had been an invalid for several years. They were given pyorrhea treatment, which eliminated considerable of the infectious material; first stock vaccines and then autogenous vaccines were used with most excellent results. Within two weeks these patients showed marked improvement with regard to the mobility of the joints.

Dr. L. Duncan Bulkley, New York: I find the use of peroxid of hydrogen as a local remedy very satisfactory. I use it, first, in ordinary strength, increasing it, as necessary, even to full strength. I insist on slow and complete mastication, with some self-massage, as a means of promoting nutrition in the gums, and I am positive that all the cases in which this has been well carried out have been benefited, and the trouble has often been overcome. I never could see the sense in simply trying to relieve the trouble locally by cleaning out or disinfecting the socket of the tooth.

It is remarkable that the three or four places in the body that have the most micro-organisms—the scalp, the mouth, the scrotum and the vagina—are the places which yield best to surgical treatment. We all know how easily wounds in the mouth heal; wounds in the scalp are easiest to treat. There is something other than the simple action of organisms to be accounted for in pyorrhea, and we should always study the soil, or state of the system, on which they flourish; when this is in the best condition possible, a relatively small amount of local treatment acts efficiently.

Dr. Truman W. Brophy, Chicago: What has been said about infection would naturally make us extremely timid regarding operations in the mouth, if it were not for the fact that has been named by Dr. Bulkley. When one may operate in the mouth month after month without getting an infection, it impresses us with the feeling that, after all, these pathogenic micro-organisms are not so much to be dreaded as one would assume on general principles. We all know that we cannot remove them from the mouth by any kind of washing, irrigation or brushing; that they become imbedded in the mucosa in such a way often that their removal is absolutely impossible, and that even in the presence of pathogenic micro-organisms we do get good results without infection. We ought, however, to do everything in our power to make the parts as clean as possible. I think that it is wise, when possible, to irrigate the nose, mouth and pharynx prior to any operation in that field.

Dr. A. Parker Hitchens, Glenolden, Pa.: The discussion today indicates that we are at last getting away from the idea that bacterial vaccines alone can cure this infection. The reason we have local infections at all is because the bacteria have been assisted in some way to overcome the body's normal antibacterial forces. The assistance in pyorrhea comes through serumal calculi, tartar-plaques, foreign bodies and traumatism. The resulting inflammation apparently hinders the ready access of the normal curative substances in the blood and lymph to the organisms present. There is just about space enough between the cells constituting the inflammatory area for toxic substances to pass out into the tissues, but not sufficient room for antibacterial substances to get in; so that, even though the opsonic index is raised, no benefit results to the patient. The rational way, therefore, to treat an infection, the inception and continuance of which is facilitated by the presence of foreign irritating substances, is to remove the foreign bodies and possibly also the inflammatory tissue; in other words, local treatment must be resorted to.

Dr. Nelson T. Shields, New York: One point has been overlooked, and that is in regard to the saliva. After thorough prophylaxis and the removal of all the micro-organisms from the fermentation of food, you leave the mouth in a normal condition because the saliva counteracts all other acidity that forms when the saliva is normal. But for the saliva we would not have teeth very long.

A splint for holding loosening teeth should be so made that not only the saliva can circulate between the teeth just as well with the splint in place as without it, but also that the soft tissues will be protected. This is best done by extirpating the pulps from all teeth involved in the splint and, after thorough cleansing mechanically, asepsis being maintained, filling the canals with gold at their apices and with oxychlorid of zinc in the remaining portions. This being done the teeth can be prepared in such manner that the mechanism in the construction of the splint will allow the saliva to circulate between the teeth, which will keep the mouth normal. The extirpation of the pulps and canal-filling described will prevent the wasting of alveolar process and gums, which would certainly follow should this important point be overlooked.

FIELDS FOR RESEARCH IN ORAL SURGERY*

BY VIRGIL LOEB, A.B., D.D.S., M.D., ST. LOUIS, MO.

TO DISCUSS THE VARIOUS possible avenues of research in that branch of medicine known as stomatology would require a paper the reading of which would far exceed the time allotted to me. I have, therefore, selected a single division of this branch, and shall confine myself entirely to the discussion of some of the fields for research which are still not definitely worked out in oral surgery. To facilitate this discussion, the investigative fields are divided into five classes: embryologic, anatomic, bacteriologic, physiologic and chemical. Moreover, I shall not attempt to enumerate or to discuss all of the problems in each class, but shall mention only a few of the more important ones.

The embryologic problems for study comprehend the following: cleft-palate, harelip, fistula of the lip, fissure of the tongue, fissure of the cheek, facial asymmetry and congenital teeth, of which cleft-palate and harelip, alone or combined, are the most frequent. A great deal of work has already been done on the etiology of the latter deformities; cleft-palate has even been produced experimentally in animals.

Many theories have been advanced as to the cause. That family prevalence as an important factor was long ago established by cases reported by Mercer Adam,[1] notably of a woman whose five children all had harelip, and by Merkel[2] in his reference to Anna's observation of a man who had by his first wife eleven children, nine of whom were born dead, and two alive, with harelip; and by his second wife four children, two of whom had the same deformity, and one cleft-palate. Direct heredity is noted in the case of R. G. H. Butcher[3] in which both mother and child had double complicated harelip with entire absence of the palate. Many more cases of heredity have been noted in more recent times.

P. Albrecht[4] pointed out the fact that the commonest position for cleft of the alveolar arch, accompanying harelip, corresponds to the interincisor suture, running through the premaxilla and separating the central from the lateral incisor teeth. Formerly it was the belief that the fissure in the bone corresponded to the suture between the premaxilla and the superior maxilla and that therefore the incisor teeth (after eruption had taken place) lay internal to it. Ballantyne thinks that too much

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*Chairman's address before the Section on Stomatology (A. M. A.) of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with the *Journal American Medical Association.*

[1] Adam, Mercer, Month. Jour. Med. Sc., 1854, ix, 402.

[2] Merkel: Handbuch de pathologischen Anatomie, 1812, i, 19.

[3] Butcher, R. G. H.: Dublin Jour. Med. Sc., 1877, lxiii, 426.

[4] Albrecht, P.; Centralbl. f. Chir., 1884, xi, 521. Deutsch. Ztschr. f. Chir., 1884, xxi, 201.

significance is given to the morphology of the incisor teeth in arguments for and against Albrecht's views. He[5] says:

> After all, it is not to my mind an unthinkable theory that the cause, which arrests the development of the face and makes permanent what ought to be a transitory arrangement of parts, may also act on the dental germs in the jaw and lead one germ to atrophy and another to increase in size and perhaps divide in two. The facts of embryology must first be thoroughly investigated (teratological developments being utilized as hints to direct research), and then the general principles of teratogenesis must be applied to the scrutiny of the results; if this be done, I feel sure that the actual mode of production of harelip and all other malformations will be made plain. Of course this does not mean that the cause which leads to the arrested developments will be discovered, although we may be in an infinitely better position to make surmises regarding its nature; we shall then, I expect, find we are dealing with the germinal factor.

Continued work along this line with similar investigation concerning the other anomalies of development should yield results of great value.

Anatomically, a number of interesting fields present themselves for investigation. Certain surface areas are yet to be determined. It would be of service, for instance, to know the surface area of the hard and soft palates and of the tongue. Last year I presented a paper[6] before this Section, and I had hoped to present at this meeting a paper on the superficial area of the palate; but as my data are not sufficiently complete. I am compelled to postpone it.

The papillae of the tongue offer interesting problems for investigation. The studies of the arrangement of these papillae, especially the vallate, by Giacomini, Stahr, Hopf and Edzard, and Kunitomo[7] seem to show that fairly well-defined types exist in the white and colored races. This deserves further study.

Another anatomic problem concerns the exact location of the pharyngeal end of Rathke's pouch. That this is worthy of investigation has been shown by Frazer.[8]

Much might be gained by a comparative study of the musculature of the lips and tongue in the various races and the physiologic significance in pronunciation, while the distribution of the lymph-vessels in the walls of the mouth and in the tongue and soft palate is worthy of renewed study.

The bacteriology of the oral cavity has been pretty definitely worked out by Miller,[9] who described more than forty germs which he had isolated. He admitted that there were still others to be studied.

Such problems as the ages (of persons) at which the different micro-organisms appear, the relative virulence at different ages, the influence of the accumulation of deposits around the roots of the teeth on the production of these germs, and vice versa, are all of importance. Specific germs which cause caries and certain cases of the so-called pyorrhea alveolaris are yet to be determined.

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[5] Ballantyne: Antenatal Pathology and Hygiene, ii, p. 385.

[6] Loeb, Virgil: A Study of the Cubic Capacity and Superficial Area of the Maxillary Sinus, The Journal A. M. A., Aug. 3, 1912, p. 359.

[7] Kunitomo: Ztschr, f. Morphol, u. Anthrop., 1912, xiv, 339.

[8] Frazer: Jour. Anat. and Physiol., 1911, 45, 190.

[9] Miller, W. D.: Die Mikroorganismen der Mundhöhle, 1892.

Recently a great deal of attention has been drawn to the relation which the absorption of toxins from different forms of alveolar abscess bears to arthritic disturbances and other toxic manifestations in various organs of the body. Concentrated investigation along this line should yield results which will prove of great value in the diagnosis and treatment of many obscure and even remote conditions.

The saliva presents a number of important physiologic problems for investigative work.

Goodman[10] asserts that the sputum of tuberculous patients contains albumin. Normally the saliva and sputum do not contain this substance. The assertion made by Goodman, which has been denied by other workers, will bear further investigation in order to determine the significance of albumin in pulmonary tuberculosis.

Neubauer and Fischer[11] and Sanford and Rosenbloom[12] all assert that in carcinoma of the stomach there is an enzyme present which splits up glycyltryptophan. Warfield[13] and others assert that there is in the normal saliva the same enzyme which does the same thing. This is of such vast importance to the clinician that further work should be done to substantiate or to disqualify Warfield's statement.

Quite a little work has been done on the sulphocyanid which is found in the saliva. This substance is found in excess in smokers and it is a question as to whether or not it is due to some metabolic process.[14]

Fricker's[15] work opens up a new problem: Is the saliva a stimulant to the gastric juice? If so, is it due to carbon dioxid as he suggests or to the presence of a hormone? The view that the latter theory may be true fits in well with the work of Bayliss and Starling, that many of the body functions are due to the influence of the so-called hormones.

Another field for investigation concerns the formation of tartar. Is the ordinary explanation correct? Are the calcium salts, held in solution, precipitated by the action of the carbon dioxid in the saliva, or is tartar due to some other chemical action, or perhaps to bacterial action?

Of course this problem should perhaps come under the chemical or bacteriologic sub-division which I have made for the classification of research work, but it also concerns the physiology of the saliva.

[10] Goodman, Edward H.: The Diagnostic Importance of Albumin and Albumose in the Sputum and Their Relation to Occult Blood, Arch. Int. Med., August, 1911, p. 163.

[11] Neubauer and Fischer: Deutsch, Arch. f. klin. Med., 1909, xciii, 499.

[12] Sanford, Charles H., and Rosenbloom, Jacob: The Glycyltryptophan and Tryptophan Tests for Cancer of the Stomach, Arch. Int. Med., April, 1912, p. 445.

[13] Warfield: Bull, Johns Hopkins Hosp., 1911, xxii, 150.

[14] Mendel and Jackson: Am. Jour. Physiol., 1901, v, 274.

[15] Fricker: Therap, die Gegenw., September, 1910.

So much significance is given to the urine and feces, does it not seem plausible that the time will come when the saliva, too, will undergo a routine examination as do these two excretions?

Fields for research in the oral cavity, of a purely chemical nature, are perhaps less numerous than those of the other divisions. Mention has already been made of formation of tartar. Under this head would also come a study of the combinations which are formed by the action of the different tooth powders and pastes and mouth-washes which are used so generally by the public. The chemical combinations resulting from such mixtures may play a part in the production of certain oral lesions, particularly those of a purely dental nature.

The etiology, diagnostic relations and treatment of several diseases of the oral cavity are still uncertain, and for this reason offer a promising field for research. Among the more important ones the following are worthy of study: trifacial neuralgia, stomatitis aphthosa, leukoplakia, ankylosis (certain types), pyorrhea alveolaris or interstitial gingivitis, chronic enlargement of the salivary glands, particularly the parotid, scurvy, noma and malposed teeth.

I have brought this subject to your attention for the purpose of urging on you the great necessity for encouraging work along the investigative side of oral surgery. Until those who are devoting themselves to this subject impress on their students and associates the full value of research in this connection, we are bound to become routinists and no progress can be made.

537 North Grand Avenue.

ABSTRACT OF DISCUSSION.

Dr. F. B. Moorehead, Chicago: One thing ought to be said about research, and that is that it cannot be bought; neither can original investigators be bought. The original worker, like the poet, is born, not made. A peculiar fitness for that kind of work must be inherent in the individual. When a man has been in practice for a few years and has become fixed in his habits, he is not likely to change. Our only hope lies in the undergraduate student, who is still in the formative period. I believe that the hope of the future is in selecting students who have the scholarship, the vision, the inclination and the natural ability to do original work, and in starting them out before they become established in the routine of dental practice. We must also remember that the medical profession is taking as much interest in the oral cavity in its relation to the composite organism as is the dental profession, perhaps more in some instances. The dental profession should take the initiative in this work. We should point out the relation of the oral cavity to systemic disease. We ought to do as much for the oral cavity as the eye specialist has done for his work and as the ear, nose and throat specialist has done for his work. We have not done it, and the fact of the matter is that at present we are being driven into the corner by the medical man, and, like a stag at bay, we are now fighting absolutely in defense of our position.

The medical college of today is paying more attention to the oral cavity than it has ever done before, and more work is being done by the undergraduate medical student in this line than ever before, and that is significant. May it not be true that if we do not do our work, the medical men will take it on themselves to develop the diseases of the oral cavity as a special field of practice?

Dr. Truman W. Brophy, Chicago: When in the history of our country it became necessary to create currency for the use of the people, greenbacks were issued in enormous quantities. The currency was increased to a degree that brought the value of a dollar down to about forty cents in the estimation of the world. When the time came for returning to specie payment, the President of the United States decreed that the only way to resume specie payments was to *resume*, the advice of many statesmen to the contrary notwithstanding; so the nation resumed specie payments. So, when it comes to the question of scientific development, the only way to acquire information along scientific lines is to acquire it, and the way to acquire it is to have men do that work who are well prepared and placed in the proper environment to do it. As Dr. Moorehead said, a busy practitioner cannot devote much time to laboratory work. As a rule, he has neither the time nor disposition to do it. Men must make that work a business. I shall expect in the next decade to see such institutions as the Forsythe Laboratory established in Boston with a liberal endowment, and the Thomas W. Evans Institute, which also has a liberal endowment, gather together men prepared to engage in scientific work. Unfortunately, in our own country few men have taken up the study of that branch of pathology particularly associated with the mouth.

Dr. T. L. Gilmer, Chicago: The paper is timely. It would be impossible for us to discuss some of the things presented because there has not been sufficient development to arrive at definite conclusions.

Dr. Moorehead spoke wisely when he said that research work cannot be bought. When we look back over the history of medicine and that branch which we represent and consider the men who have made the great discoveries, we see that they have not been hired men. To do original research work, a man must be especially fitted for it, by temperament and by nature. He must have a zeal for his work that is overpowering; then he succeeds. Such men are not made; they are born.

I am doubtful as to the utilization of students for this work, since it seems impracticable to expect good research work of men who have had no practical experience. Indeed, one should have had much practical experience, otherwise he will not know the full value of that for which he looks. If young men in their college work exhibit inclination for research work they should be stimulated and encouraged in that direction.

There is one class of men specializing in dentistry at present to whom I think this paper should appeal. I refer to those who call themselves ''pyorrhea specialists.'' I have no patience with any man calling himself a specialist who is not doing good research work in his special field. Are all pyorrhea specialists as a class well informed in histology, pathology and bacteriology of the special tissue they operate on? If they are not, they are not worthy of the name of specialists.

Dr. William C. Fisher, New York: Speaking of buying research work, the First District Dental Society of New York has secured the services of the most eminent physiologic chemist in the east, and he has for two years been working on the saliva. He has given us few facts in that time, and the reason is that he is not a stomatologist or a dentist. He is a chemist.

The dean of one of the largest dental departments of a university in the east told me over a year ago that for the past seven years he has gone to every class and watched it carefully in order to find a man of whom he can make a research worker, but he has not found him.

Dr. G. V. I. Brown, Milwaukee, Wis.: As suggested by Dr. Brophy, there are now a number of propositions leading toward the establishment of laboratories in which work of this kind can be done. They must have an endowment which will permit them to pay persons to carry on this work. As has been said, a man who is busy making a living cannot devote himself to research work, and a man's education to fit him for this work should begin early; but the trouble is that the men who have the education and who have the time are often men who have not had the foundation of a practical experience which teaches them to know the direction in which their researches can be carried on to the best advantage. Those who have felt the need of this kind of work should give it definite, concerted and systematic thought, so that these various projects may be launched successfully and in a direction which will yield the greatest good in the shortest possible time.

Dr. Nelson T. Shields, New York: In research work, and especially in research work with regard to the oral cavity, which lies so near the central nervous system, if we would bend our efforts in the direction of the neuropathologist we should find that the origin of pyorrhea, etc., results directly from the degeneration of the entire system, caused by the fact that the night's rest is not sufficient to restore the loss of tissue which takes place during the day.

Dr. William H. DeFord, Des Moines, Iowa: I have been doing research work for a number of years and consequently am much interested in this matter.

Dr. Loeb's warning is timely. We should take greater interest in these matters pertaining to our everyday work, because, if we do not, the medical men will do it first, for they are fast entering this field of investigation which rightly belongs to the stomatologist and dental surgeon. Recently, Dr. Charles H. Mayo emphasized the danger of local infections resulting in constitutional disturbances, and he warned the dental profession that unless they were active in working out the etiology of pathologic conditions found in the buccal cavity the medical profession would certainly do it for us, and the credit would be theirs. I am heartily in accord with the work being done by the research committee of the National Dental Association. If the right men can be induced to devote their lives to working out these problems for us, giving us the results of their labors, it will meet with hearty approval, but I hope that this will not interfere with individual research work. We should not rely entirely on the work of professional research investigators. The outline furnished by Dr. Loeb is a most excellent one, and no doubt it will stimulate men to go into these matters more thoroughly than they have done in the past.

Dr. Virgil Loeb, St. Louis (closing): When I chose this subject, I felt that the question of research work was so important that it could not be brought before the profession too often. When I started to write the paper, however, I found that it was indeed quite an undertaking to outline the various branches of work which are open for investigation. The discussion has brought out a number of points which I could not incorporate in the paper. One is the question of who should do this work; another is the question of how it should be done.

It has been said once or twice in the discussion that the busy men cannot do research work. I think that it is he alone who should do it. It is the man who is in contact with definite problems daily who can determine the principles which must be worked out.

Austrian War Song

Hurrah, hurrah, we'll sing the jubilee,
Hurrah, hurrah, the flag that sets us free;
So we'll sing the chorus from Zxcnkqvipf to the sea,
While we go marching through Skylpogwofnifzixmifqobjifpof

—*Cincinnati Enquirer.*

FROM THE BORDERLAND OF MEDICINE AND DENTISTRY*

BY HERMANN PRINZ, A.M., M.D., D.D.S., ST. LOUIS, MO.
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THE EVOLUTION OF THE MEDICAL SPECIALIST within the province of the general practitioner received its present impetus with the dawn of the 19th century through the introduction of specific research. However, even in the remotest periods of medical history we meet with examples in which physicians confined their activity to the treatment of special diseases. Apparently there has always existed a desire on the part of the general practitioner to limit the field of his usefulness to the care of disturbances of single organs or to the treatment of specific ailments. Herodotus, for instance, makes a very positive assertion regarding the specialization among the Pastophores, i e., the Egyptian physicians. He states that: "Medicine is practiced among them (the Egyptians) upon a plan of separation: each physician treats a single disease and no more. Thus the country swarms with medical practitioners; some undertake to cure diseases of the eye, others of the head, others, again, of the teeth, others of the intestines, and some others which are not local." In the early writings of the Zend Avesta, definite instructions are given to the surgeons, i. e., "that he must first thrice essay his skill upon a slave or on a lower cast of man before operating upon his betters." Among the Greeks medical specialists apparently were of common occurrence. Plato in The Charmides records the following pertinent complaint as made by Socrates regarding the increased tendency of specialization: "And this is the reason why the cure of many diseases is unknown to the physicians of Hellas, because they are ignorant of the whole, which ought to be studied also, for a part can never be well unless the whole is well." Similar conditions prevailed among the Romans; their leading physicians were either native Greeks or they had received their medical education on Greek soil. To receive proper recognition by the medical fraternity it was essential for the young practitioner of ancient times to include in his curriculum a pilgrimage to the world-famous shrine of knowledge, the University of Alexandria. From the time of its foundation by Alexander the Great, about 320 B. C., to its destruction by Omar, A. D., 641, this exalted seat of learning exercised a most wholesome influence on the higher types of education in all its branches of the then known civilized world. The paralyzing influence of the medieval age on scientific matters in general impressed its stamp of retardation also indelibly on the development of medicine. The only bright star in this period of papal despotism is the appearance of Peracelsus, the "Luther of Medicine," as he has been appropriately christened. When on St. John's day, in 1527, Paracelsus burned publicly in the market place of Basel the works of Celsus, Galen, Avicenna and other orthodox medical writers, exclaiming, "I have burned all these books so that all misery may be carried away with their ashes," a new era had dawned in scientific medicine.

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*Read before the Cleveland Dental Society, 1913.

Fortunately, medicine has had its renaissance. With the reorganization of the Vienna Medical School by Van Swieten, in 1850, scientific research received a reverberating impulse and its vibrations are felt to this very day. Laryncology saw its birth in 1855 with the introduction of the laryngoscope, more or less simultaneously, by Garcia, Czermak and Tuerck, although Liston had stated in 1837 that: "the existence of the swelling of the laryngeal mucosa can often be ascertained by means of a speculum; by such a glass as is used by the dentist on a long stalk previously dipped in hot water, etc." The dental mirror, by the way, this most utilitarian instrument of our whole armamentarium, was introduced about 1800 by Chevalier Bartholomeo Ruspini, a prominent Italian dentist then practicing in London. There seems to be sufficient evidence to assume, however, that the Roman surgeons at the beginning of the Christian era used such an instrument for the inspection of the oral cavity. The divorcing of opthalmology from surgery was largely brought about by the fundamental operative work of Graefe (1850), in which he was materially aided by the discovery of the ophthalmoscope by Helmholz in 1851. About this period the knowledge of diseases of the ear was placed upon a rational basis by Politzer and Gruber and Hebra founded the science of dermatology.

The most remarkable achievements in the specific domain of major surgery are to be accredited to two epoch-making events, i. e., the discovery of general anesthesia and the introduction of antiseptics. "If America had contributed nothing more to the stock of human happiness than anesthetics, the world would owe her an everlasting debt of gratitude" said the late Samuel D. Gross, the eminent surgeon, who had ample opportunity to observe in his own operating room the vast changes that followed the introduction of this boon to suffering humanity. To the dental profession of the United States belongs the honor of having introduced the first practical method of obtaining complete anesthesia. With the introduction of nitrous oxide gas by Horace Wells, in 1844, the stimulation for further research in this particular field was initiated, and the future development of anesthesia was merely a sequence to the incentive given by this New England dentist. The introduction of local anesthesia into minor surgery by Carl Koller, in 1884, is of equal importance and some of the recent developments in the treatment of diseases of the eye, ear, nose and oral cavity depend almost exclusively upon the remarkable achievements obtained through the possibilities of inhibiting sensation within circumscribed areas of tissue. In 1867, Joseph Lister published his preliminary paper on "The Antiseptic Principle in the Practice of Surgery," and with the popularization of this procedure and the much dreaded hospital gangrene, puerperal fever and similar infections were apparently miraculously reduced to a minimum in surgical practice. Proper credit, however, should be given to the Hungarian Semmelweis and the genial "Autocrat of the Breakfast Table," Oliver Wendell Holmes, who in the early fifties were at least partially successful in reducing the ravages of puerperal fever by employing empirically antiseptic procedures, and to Pasteur, the French scientist, who laid the foundation for the conception of fermentation in its relation to infectious diseases.

For the ready comprehension of the possibilities in the domain of applied medicine it is essential that we should, even if only in passing, mention an investigator whose name will be forever indelibly engraved upon the records of medical lore—Rudolf Virchow. The revolutionary changes in the conception of the causes of diseases took place with the publication of his Cellular Pathology in 1858. "These lectures," as he states in the preface of this classic in modern medicine, "were particularly intended as an attempt to offer in a better-arranged form than had hitherto been done a view of the cellular nature of all vital processes, both physiological and pathological, animal and vegetable, so as distinctly to set forth what even the people have long been dimly conscious of, namely. the unity of life in all organized things, in opposition to the one-sided humoral and solidistic tendencies, which have been transmitted from the mythical days of antiquity to our own times and at the same time to contrast with the equally one-sided interpretations of a grossly mechanical and chemical bias—the more delicate mechanism and chemistry of the cell."

The practice of dentistry is as old as the history of medicine and is so closely interwoven with it that it is impossible to distinguish it from its mother science. With it it had to share its trials and tribulations. Its resurrection and rehabilitation are to be credited to Fouchard, who, through the publication of his work, "*Le Chirurgien Dentiste, ou Traitê des Dents,*" in 1728, gave the incentive for renewed activity on practical, as well as theoretical, research in dental science. Prior to 1839 comparatively few important communications on dental surgery had appeared. The foremost literature of this time was published in France and England, and a few books of importance appeared in Germany. The United States was at this period principally concerned with the practical development of this new branch of the healing art, and with the exception of the writings of Longbotham, E. Parmly, L. S. Parmly, Flagg, Trenor, Fitch, Bostwick, Spooner, S. Brown, the Burdells, and others, little was printed in relation to dentistry. Dental text books, if used at all, were imported from England, or translations of French works were published. Koecher, a practitioner of international reputation, pictured the situation quite correctly when he stated, in 1826, that "in the United States, although little or nothing has been done in the way of publishing on the subject of dental surgery, yet I feel myself authorized to say that in no part of the world has this art obtained a more elevated station." It must also be remembered that the individual practitioner of this period was extremely jealous of any special knowledge which he happened to possess, and he usually guarded this acquired proficiency very carefully. No specific current dental literature was in existence at that time, and comparatively few medical journals tried to disseminate the progress of medical and, incidentally, dental knowledge. The few journals were seriously hindered in this laudable effort by the extreme difficulties of interchange on account of the very limited facilities of the postal services. The first dental periodical of this or any other country appeared in 1839 under the name of *American Journal of Dental Science.* The birth of dentistry as a distinct and definite profession may be recorded simultaneously with the date of incorporation of the first dental college of the world, the Baltimore College of Dental Surgery, which received its charter in 1839. Medicine and dentistry were from that year practically divorced, and, while dentistry in its early days depended very largely on medicine for its further development it bases its fundamental studies at present on general biology exactly in the same manner as medicine, veterinary medicine, or any other branch of the healing art is forced to do.

Whether a full medical education is deemed essential for the practice of dentistry is a question too profound to be answered in a haphazard superficial way. It is probably not amiss to repeat here what the late much-lamented Miller had to say on this point in his last published communication read before the meeting of the International Dental Federation at Amsterdam in 1907, and, which, unfortunately, has not received the wide publication which it deserves:

> To demand a full medical education for a dentist for the sole reason that this would put him on a par with a physician however desirable this may be, would be a retrograde step if thereby the time which he had to devote to special dental work were restricted and his efficiency impaired. The chief and foremost function of the dentist is to care for the teeth and just to the extent in which he is able to do this successfully to the same extent will be able to prevent diseases of the contiguous parts and to materially aid in preserving the health and vigor of the whole body. Dentistry has a most intimate relation to the science of medicine and there is so much of medicine that the dentist should and must learn that for this very reason he should not be burdened with things which are irrelevant to his profession. Certainly the relations of the teeth to the neighboring parts, and through the nervous, vascular and lymphatic systems to remoter parts, are quite as manifold and complex as those of the eye or ear, and why should the dentist be expected to know less of anatomy than the aurist or ophthalmologist? The same question may also be asked in respect to physiology, hygiene, general pathology, bacteriology, etc. I personally would say in answer to this

> question, that the science of medicine in all its branches is growing so rapidly, and has already become so extensive, that no one, even though he may have five, ten or even twenty years for study, will ever be able to master all parts of it equally well, and that it will be expedient if not necessary in the future that every specialist restrict himself more or less to those branches of study which have a direct bearing upon his own specialty. There is no more reason for the aurist than for the dentist to devote months to acquiring a thorough knowledge of obstetrics of gynecology, or even of the anatomy of the extremities. A great many subjects included in the curriculum of the medical student are just as superfluous for the various other specialties as they are for the dentist. The former are, however, bound by the fetters of tradition from which the dentist is free. But sooner or later they too will be obliged to break away from them and to recognize the fact that no man can master the whole of medical science and that a thorough knowledge of those branches which are more closely connected with his specialty will serve him better than a superficial knowledge of all.

The diseases of the teeth and their adnexa can, by reason of special fitness, best be treated by the dentist. The oral cavity is his chosen field and Magitot's much-coveted desideratum: "*Tout dentiste doit étre medécin et tout medécin doit étre dentiste*" will always remain a sincere wish.

From the rather extensive borderline of medicine and dentistry we have elected at random, for our present discourse, a few items which, by virtue of their close relationship and apparently frequent occurrence, may prove of mutual interest both to the oral specialist and the general practitioner.

GENERAL DISTURBANCES ARISING FROM INFECTED TEETH.

Pericementitis usually manifests itself in an acute or a chronic form. The differentiation is not so much dependent upon the period of time required for the manifestations of the respective process but upon the changes which occur in the involved tissues. In the acute form purulent destruction of the involved areas is the most pronounced pathological sequence, while in the chronic form, nature protects herself against the invading foe in a most ingenious way by a vital response, i. e., a reactive inflammation which results in the production of a fungous growth known as a granuloma or as it was termed in the past, the abscess sac or pyogenic membrane. These granulomas frequently contain epithelial tissue and are often the starting point of radiculat cysts. Hence, when operating upon these cysts, the cyst wall should not be closed up after draining but the cavity should be made continuous with the epithelial lining of the mouth.

One of the most interesting early manifestations of infectious diseases about the oral cavity, including the involvement of the pericementum of the teeth, is the enlargement of the lymph nodes within the affected region. Lymph plays a very important part in the metabolic changes within the human economy, in fact, it bears a more intimate relationship to those processes than the blood. Lymph acts as a sort of a buffer between the tissues and the blood. The animal body is guarded against the invasion of foreign substances by special protective ferments as Abderhalden has termed these substances. These omnipresent ferments which are secreted by the cells possess specific characteristics: their primary functions consist in the breaking down of the foreign substances, i. e., food, drugs, bacteria, etc., and preparing them either for absorption or the unsuitable material is rejected to be removed by elimination. The prepared material is again assorted by the lymph glands, and only after having finally passed muster is it allowed to enter the circulation. The principal lymph nodes which are specially concerned with the teeth and the tissues of the mouth are situated in the anterior part of the digastric triangle, near the submaxillary gland just below the border of the mandible. and a large node is usually found near the facial artery. These nodes are not easily located, but by employing bi-manual palpation, i. e., by inserting the finger of one hand into the mouth near the floor of the oral cavity and using the finger of the other hand from the outside one is usually able to feel the gland. Even the presence of lymph spaces in the tooth pulps must be granted although they have, until recently, offered great difficulties to their histological demonstration. However, diseases which are confined solely to the tooth pulp do not alter the lymph nodes. but as soon as the peridental membrane is involved, swelling of the respective gland occurs and no doubt the protective influence of their physiological action makes itself known thereby.

Serious infections of surrounding structures or even general infections from septic teeth are by no means of rare occurrence. The frequently observed ravages of osteomyelitis about the jaws are examples of such possibilities. The majority of actinomycosis infections about the face have found their gateway through a septic tooth and the passage of tubercle bacilli through the same route is also positively established at present. Endo- and pericarditis, meningitis and septic pneumonia, having had their starting point in an innocent-looking pulpitis, have been recorded. Oral sepsis by way of continuity may involve the tonsils, the pharynx, the stomach and the cervical glands. According to William Hunter septic gastritis and toxic neuritis, and their many sequels, are common manifestations of pus absorption from a septic mouth. While these infections are usually of a mixed type, as already stated, specific infections, including syphilis, are also observed. Virulent infections from the Plaut-Vincent spirocheta dentinum and other fusiform types have been recently brought to general notice. Most favorable results in the treatment in this last-mentioned disease and similar suppurative conditions in the oral cavity are obtained with Talbot's glycerole of zinc iodide (zinc iodide 3 parts, water 2 parts, iodide crystals 5 parts, and glycerine 10 parts). From a wide experience we can recommend this compound conscientiously to our confreres. According to Zilz, the local application of a ten per cent. aqueous solution of salvarsan in connection with a diluted neutral hydrogen peroxide solution as a mouth wash is of service in the treatment of the Plaut-Vincent angina.

MANIFESTATIONS OF NERVOUS DISEASES IN THE ORAL CAVITY.

Certain types of nervous diseases are apt to produce specific prodromal symptoms in the mouth and the teeth which may be of the utmost importance for the early recognition of their existence. By an early observation of these symptoms the dentist may often render an inestimable service to his patient. He may be the first observer to detect the manifestation of the existing ailment. We refer especially to the disturbances involving the trophic nervous system and particularly to locomotor ataxia and diabetes. Locomotor ataxia, also known as *tabes dorsalis* or posterior spinal sclerosis, indicates a chronic progressive degeneration of the dorsal columns of the spinal cord and of the sensory nerve trunks. The disease occurs principally in the male after middle life and it manifests itself in the advanced stages by interfering with the functions of movement, accompanied by fulgurating shooting pain in the extremities, etc. In the mouth the initial sign of its presence is manifested by a more or less complete analgesia of the dental pulp. The pulp may be entered into and wholly removed without the least sign of sensation. In the more progressive stage the teeth may become loose or may be lost without causing pain. Sometimes sequestration of the alveolar process occurs and, in rare cases, spontaneous fracture, usually of the mandible, may take place. Ulceration of the soft tissues near the alveoli is often observed; it may result in necrosis of the underlying bone and may lead to spontaneous opening of the antral sinus. The so-called dry sockets, i. e., slow-healing empty alveoli after tooth extraction, should always be looked upon as suspicious prodromes of locomotor ataxia or diabetes. If the above symptoms present themselves in the oral cavity the dentist should at once make an effort to verify the diagnosis by looking for the typical diagnostic signs of locomotor ataxia, i. e., the impaired reaction of the pupils against light—the Argyll-Robertson sign; the loss of the knee jerk—the Westphal sign; and the swaying of the body with the feet close together and the eyes closed—the Romberg sign. The technic of applying these signs is found in any good work on the practice of medicine. If suspicion is verified, medical aid should at once be solicited.

Somewhat similar symptoms are often observed in the mouth as an indicator of a disease which is only partially related to the nervous system; it is diabetes. The term "diabetes" primarily means "a running through," signifying the increased amount of urine voided during the presence of the disease. If the increased quantity of urine is the only sign of the disease we speak of it as diabetes insipitus, while the constant additional presence of sugar indicates the more severe form, diabetes mellitus.

Diabetes mellitus is a disease of impaired nutrition. Faulty metabolism, resulting from the materially reduced power of the tissues to burn up grape sugar, is the causative factor. Post-mortem examination of diabetics usually shows very few or no morbid changes of the organs, with the exception of the brain. The sequence of this inhibition of chemical changes in the body is the presence of sugar in the blood; it results from the diminished destruction of the sugar, and, as a consequence of this incomplete metabolism oxybutyric acid, diacetic acid and acetone are formed, which, with the sugar, are excreted with the urine. The nervous system being the controlling factor of the chemical changes in the muscle tissue, it seems proper to suspect certain disturbances which originate in the central nervous system as the primary factors of this disease.

It is well known that diabetes mellitus lessens the resistance of all the tissues of the body; gangrene and a tendency to form carbuncles are ample illustrations of this lowered vitality. Dry sockets, as we have referred to above, are frequently traced to existing diabetes. According to Naunyn, this pronounced tendency to local infection may be partly explained by the ever-present sugar in the tissues, thus furnishing rich food to certain forms of schizomycetes. The presence of thrush which is so frequently seen in the mouths of diabetics may be explained on this basis. The best authorities agree that no sugar is found in the saliva of the diabetic; however, a distinct acid reaction of the oral fluids is usually observed. This acidity, to a large extent, is responsible for the increased sensitiveness about the necks of the teeth in the advanced stages of diabetes; it is the usual forerunner of rapid decay about this region. The circular ligament becomes swollen and livid; it loses its hold on the tooth, and thus opens a ready gateway to the ever present pathogenic bacteria. The formation of pus pockets with concomitant destruction of the peridental membrane and necrosis of the alveolar process and final loss of the tooth, i. e., typical pyorrhea alveolaris. The teeth of the upper arch are usually attacked prior to the lower teeth. The articulation of the arches is destroyed, and, as a consequence of the force which is produced by the more firm teeth of the mandible in their curve of motion against those of the maxilla, the latter readily give way and more or less prognathism or Arkoevy's diastema results. The percussion fromitus of Landgraf, which is observed by placing the finger over the root end of the tooth and tapping the crown, forms a valuable diagnostic sign of determining the progress of destruction of the alveolar plates. Some writers have made the authoritative statement that pyorrhea alveolaris is always the sequence of diabetes. This statement is undoubtedly too sweeping since a genuine pyorrhea may also be observed as a sequence of other predisposing factors, i. e., metabolic disturbances, tuberculosis, rickets, scurvy, syphilis, chronic dypepsia, metal intoxications, etc. In reality, the term pyorrhea alveolaris is a collective phrase; it merely indicates a complex symptomatology. From the view-point of the clinical pathologist we would strongly urge to adopt Rhein's suggestion regarding the etiological classification of pyorrhea alveolaris, i. e., "to prefix an adjective stating the name of the disease which is causing the pathological symptoms in the oral cavity, as rheumatic pyorrhea, lead pyorrhea, etc."

The very rapid formation of calcareous deposits about the necks of the teeth in the diabetic is an important diagnostic symptom. This "tartar" is usually of a light yellow color and it feels rather soft to the touch. The deposits are not confined to a group of teeth, but form indiscriminately all over the denture but naturally more so near the outlets of the ducts of the salivary glands. The rapid formation may be thus partly explained: The super-saturation of the tissues with acids calls forth an increased neutralization by the alkaline earths which are largely held in solution by carbonic acid and poured out with the saliva. On coming in contact with the air the CO_2 becomes liberated and the precipitated calcium salts in conjunction with precipitated mucin are deposited about the teeth. The tongue is usually found thick, of a red color, and coated, showing the imprints of the teeth. The gum papillae are enlarged; the mucous lining of the mouth shows a livid color resulting from the hyperacidity of the blood and the mouth is usually extremely dry. The typical odor arising from the breath of the diabetic is often readily observed by the oral specialist. It is a peculiar chloroform or acetone-like odor, resembling somewhat sweet cider. This odor is due to the acetone compounds formed in the body.

Trophic disturbances during the period of development of the teeth usually interfere with their perfect calcification. Scarlatina, rickets, very early acquired and hereditary syphilis, etc., are productive of specific forms of hypoplasia of the enamel. Nutritional interferences after the permanent teeth are fully formed may leave their imprints upon the bone, but no visible signs are observed upon the crowns of the teeth. Pathological diastema may and does occur in diseases of the thyroid gland in the adult or, in the abnormal growth as observed in acromegalia. A marked change in the size of the jaws, usually the lower, may take place, but the teeth themselves are not affected by these alterations. Diastema and wandering of the teeth is also frequently observed in premature atrophy of the alveolar process. In athyroidism (cretinism), marked anomalies of the structure and the shape of the teeth are of common occurrence. The mere presence of the so-called Hutchinson's teeth is not a sufficient criterion of an existing hereditary syphilis; they are observed in only about twenty-five per cent. of cases. The Hutchinson deformity, by the way, is not merely confined to the incisors and canines but is also frequently present as a marked dystrophia in the occluding surfaces of the molars (Fournier).

As a comparatively rare tropho-neurotic disturbance about the external and, less so, the internal mouth herpes zoster should be mentioned. This vesicular eruption usually runs unilaterally along the superficial nerve trunks, and is more or less accompanied by neuralgiform pain. It is most commonly met with as a sequence of various infectious diseases; recently it has also been observed about the mouth after an injection of salvarsan and in a case reported by Zilz, following the eruption of a supernumerary lower canine. This tooth, which, by the way, showed marked anatomical derangements causing severe pressure upon its own pulp, was relieved of the pain almost instantly after extraction, and the vessels dried up within a few days.

Genuine neuralgia about the teeth with the exception of pain caused by pulpitis or pericementitis is comparatively rare. On the other hand, referred neuralgias resulting from pressure of impacted teeth, pulp stones, and hyperplasia of cementum are among the commonest manifestations of severe pain in these particular regions. Of impacted teeth, the lower third, and less so the upper third, molars are most often met with. The Ahasuerus among the permanent teeth is the upper canine. In its vicarious excursions it may erupt anywhere about the maxilla and at any age. Although fully developed, the tooth may lie dormant within the body of the jaw for years, or, when irritated, may at any time start on its erratic journey to the periphery. We have had occasion to remove impacted canines from every available surface of the hard palate, from the nose, and from the antrum. In one case, the vagrant made its appearance at the age of 65 in an edentulous jaw over which a plate had been worn for more than thirty years. Retained teeth frequently showed marked absorption lacunae; genuine caries, however, has not been observed.

(To be continued.)

Enterprise

Weigh the story of thy action
With the danger of the task;
When you seek a novel venture,
Look and listen, think, then ask

If the world has not already
Placed convenient to your hand
The means to help your purpose —
To aid your new demand.

The day has long time past and gone
When each man wrought alone
To meet his every need, and so
Today 'tis clearly shown

That work is fitted to its place
Where best it can be done,
And wisdom seizes to its use
What makes success its own.

THE RATIONAL USE OF THE SILICATE CEMENTS*

BY CHARLES C. VOELKER, D.D.S., BROOKLYN, N.Y.

A WELL-KNOWN GERMAN POLITICAL WRITER, Ludwig Boerne, who lived in the early part of the last century, once said: "Nothing is permanent, but change; nothing lasting, but death." As the question of durability is, more than any other, the most vital one connected with the different filling materials to which the dentist is limited in his restoration of tooth substance lost as the result of disease, it might be well to keep the aphorism quoted above in mind when discussion centers around those materials.

By the rational use of silicate cement I mean that use of this material which is opposed to sensationalism and empiricism in practice. A few years ago, when the porcelain and gold inlay waves were inundating us, I remember prophecy proclaiming that the day of the foil filling was past: and many, even some of the older and more experienced men of the profession, were freely and enthusiastically saying that gold pluggers could now be relegated to the scrap heap. Yet I venture to assert that many within the sound of my voice still hammer in two malleted gold foil fillings for every gold or porcelain inlay that they make. The waves of enthusiasm that pass over the profession for this or that particular filling material, or method of overcoming pain, or of making our work easier and more popular, are apt to carry us, in spite of ourselves, to the verge of extremism and even of abuse; until with the passing of time and its oftentimes bitter experiences, they gradually recede and find their proper level in the calmness of an enlightened rationalism of practice. The silicate cements are now passing through a period when much abuse of them is undoubtedly being practiced, if I may judge from many cases I have seen in daily practice where their use was not indicated and where it caused death of pulps and other untoward results. Manufacturers are vying with one another to take the tide before it turns and push the sale of their products. One recent advertisement stated that enough of a certain brand of silicate cement had been sold in a short time to make five million fillings. Are we sowing the wind to reap the whirlwind?

The first esteo-plastic was introduced to the profession in the form of an oxy-chlorid about the year 1850. Following this came cements made by mixing zinc oxid with glacial (or meta-) phosphoric acid containing some ten to thirty per cent. of sodium metaphosphate as impurity or as modifier. These cements have many disadvantages which compelled investigators and manufacturers to seek a more perfect liquid. This was found in the orthophosphoric acid, which is unaltered by water and can be obtained pure. It was often modified with an alkaline or metallic phosphate. This liquid could be better controlled: and we thus have the bases of the modern oxyphosphate cements, namely, zinc oxid and orthophosphoric acid.

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*Read at the Twenty-fourth Annual Meeting of the Ontario Dental Society, Toronto, Canada, February, 1914.

We really know very little about the various cements on the market. It has always been a matter of regret to me that to the average dentist the chemistry and physics of our profession should remain so much of a sealed book; and that we have had to rely upon the manufacturers and their chemical experts for much of our knowledge regarding the things we use in our daily work. The latter are undoubtedly in possession of many facts, which are guarded carefully for commercial reasons, the promulgation of which would aid us to practice our profession less empirically and with more confidence in results.

Of all the things we use, we know probably the least about the chemical nature of the silicate cements and of the processes used in their manufacture; and it has been a work of considerable labor to find the meager data here presented.

As early as 1879, Weston's cement was introduced, and even at that date an admixture of silicate was added to the powder. An analysis of this was published and it was shown to contain basic zinc oxid 80 per cent. and silicate of aluminum 20 per cent. The latter is an important ingredient of the most modern of the silicate cements. But it was not until 1895 that a true silicate cement, as now understood, appeared under the name of Dentos. This lived but a short time and disappeared because of excessive shrinkage and recurrence of decay around the fillings.

At the thirteenth annual meeting of the Ontario Dental Society, just twelve years ago, on February 18, 19 and 20, 1902, Dr. A. A. Wilcox, of Cleveland, read a paper on "Dental Cements and the Cause of Their Failure as Filling Materials." The discussion of this paper was opened by Dr. J. B. Willmott, who brought up the question of the silicate cement known as "Archite" which had been developed and placed on the market by Dr. Wilcox a short time before that meeting. It is significant that the general discussion at that meeting twelve years ago brought out practically the same arguments pro and con which have been used in discussing all the silicate descendants of Archite. Shrinkage and dissolution were then the worst faults. One statement made by Dr. Willmott in his discussion impressed me, for it still remains true of silicate cements. He said, speaking of Archite: "Of course, not only months but years must elapse before a definite conclusion as to its permanence can be reached."

There have been so many different silicate cements offered to the profession on this continent and abroad during the short space of eight years just past, that we cannot yet form definite conclusions regarding any of them. When any single silicate cement shall have been in constant use, unaltered as to form of chemical composition and technical procedure in its manufacture, for a period of not less than five years, at least, we can begin to obtain some definite data on which to base sound conclusions as to its permanence and value as a filling material. Personally, I do not care to take this evidence at second-hand, even though some of the salesmen of certain brands of silicate cements claim that their particular product was in use in Europe for several years before it was introduced here.

Do you realize the number of silicate cements that have been placed before us since Dentos and Archite disappeared from use? The first on my list was introduced into America and placed on sale in August, 1904:

Ascher's Artificial Enamel.
Ascher's Improved Artificial Enamel.
Ascher's New Artificial Enamel.
Schoenbeck's Silicate Cement.
Ames' Berylite (called a silicious cement).
Phenakit or Phenacite, of Dr. Asch.
Translucin.
De Trey's Synthetic Cement.
De Trey's Synthetic Porcelain.
De Trey's Thenakit, or Tenacit.
Ash's Translucent Cement.
Brill's Plastic Porcelain.
Translux, the artificial dental enamel.
Dr. Rawitzer's Astral Translucent Cement.
Harvardid Porcelain.
Neues Harvardid.
Ordell's Silicate Cement.
Amamant.
Silicin.
Dr. Remmler's Emailoid (a new German product).

Some of those mentioned, and others that I cannot recall, have gone to "the limbo large and broad," because they could not fulfil the extravagant claims of their originators.

The short time that has elapsed since the invitation came to me to read this paper to you, must serve as my excuse for relying on the reports of chemical analyses made by others, and on patent specifications and information kindly given me by the manufacturers, instead of an analysis made by or for me. During December of last year I wrote to a number of manufacturers asking them to inform me what the chemical make-up of their silicate powders and liquids was, and the length of time they had been on the market. I received several replies, the gist of which I shall give you:

The Pinches Dental Manufacturing Company, who represent Ascher's New Artificial Enamel, inform me:

"That Ascher's Artificial Enamel was introduced into Europe in January, 1904, and in August of the same year into the United States. At that time the material represented fourteen years of research and experimental work on the part of Dr. Hugo Fischer and Herr Professor

Paul Steenboch. The presence of a compound of Beryllium is supposed to be responsible for the wonderful hardness, strength and translucency of this product. They claim that the right to use Beryllium in a dental cement is controlled by them. The liquid is a weak phosphoric acid, claimed to be much weaker and less harmful to the teeth than any other silicate cement liquid. Both the powder and the liquid are manufactured from the purest ingredients and Ascher's New Artificial Enamel, it is claimed, is unquestionably the first synthetic silicate cement that has ever appeared. About two years ago they started grinding their material much finer and also added porcelain colors *before* the fusing and grinding of the material, instead of afterward, as they had done with the former products. They claim that now neither the powder nor the liquid is susceptible to air exposure, the dentist has twice the working time, and the material hardens in every single instance inside of three minutes after insertion. In their new material the mix is of such a nature that the dentist is forced to make it in a correct manner."

In confirmation of the above, they sent me printed copies of the original German letters patent from the Imperial Patent Office, showing that the material was patented on October 4, 1903, and repatented on October 30, 1903.

The patents issued to Paul Steenboch show:

That Ascher's Artificial Enamel Powder is composed practically of pure Beryllium compounds. The precipitate formed from a solution of basic Beryllium nitrate. $Be\ (NO_3)_2$. 2BeO, with Sodium Silicate $Na2SiO_2$, after being allowed to remain in water for a time, is filtered, washed thoroughly, dried and slightly calcined to red heat. The preparation thus formed, whose empirical formula is 3 BeO. SiO2, is finely ground and is used alone; or if greater strength or stability is required it has intimately mixed with it either glass or alumina. The powder is rubbed carefully with about 52 per cent. orthophosphoric acid solution in which aluminum phosphate (containing a slight amount of zinc or strontium phosphate) is dissolved almost to the point of saturation. The reaction brought about during hardening is as follows: The acid liquid withdraws from the Beryllium silicate its Beryllium oxid content, leaving a hydrated silicate in which phosphates are present. Other compounds adaptable for the composition of these cements are the Beryllium oxid and the oxides of others of the light metals, such as aluminum and zinc; basic phosphates, borates and silicates, and also fluorids, either simple salts of the metals or double salts of two or more of them. In the original patent specification, silicic anhydrid (or silicic acid) was also used in the formula, which probably aided to produce translucency. For the carrying out of the process, ortho-, pyro,- and meta-phosphoric acids and their acid salts may be made use of, as well as the compounds of the light metals, zinc and aluminum; those of the alkali metals sodium, potassium, lithium; and those of the alkaline earth metals calcium and strontium. Greater translucency or increased strength are obtained experimentally by varying the quantities of the ingredients, the former being dependent upon the amount of the Beryllium compound, the latter upon the quantity of the other ingredients, probably mostly the alumina.

I have been thus minute in the description of this patent specification, since my studies of this question have convinced me that all the other silicate cements on the market at the present time, in so far as I have been able to learn anything about their composition, are but modifications of this original process, with the substitution of aluminum compounds often for the Beryllium. I believe that the credit for the discovery should go to this German investigator, Dr. Steenboch, who gave us the first successful silicate cement and indicated the path along which future investigators may work for the production of the ideal filling material.

Dr. W. V. B. Ames writes me regarding his product, Berylite, which he calls a "silicious" cement and also "a synthetic feldspar modified by rare earths":

> That these silicate cements are all oxyphosphates, being compounds of modified phosphoric acid as the liquid element and powders capable of forming basic phosphates when incorporated with such a liquid. According to this, he claims that such terms as artificial enamel, synthetic cement and chemical porcelain mean nothing as far as a formula is concerned; they all being in the hardened state oxyphosphates modified with silicious materials. Ames' Berylite liquid is a modified phosphoric acid solution and the powder is basic silicates of calcium and aluminum, aluminates and rare earths combined at so high a heat that an indescribably complex compound results. The cement has been in sufficiently perfected form for more than five years to admit of clinical and laboratory experiments. It was first generally marketed about a year ago.

Messrs. Lee S. Smith & Son Co. have kindly sent me copies of the original papers written in Germany by the discoverer of Translucin, Dr. Abraham. This silicate cement is called by its discoverer, a "plastic porcelain." It has been in use in the United States just about a year and in Europe about two and a half years. In studying his articles I find that Dr. Abraham suggests a more exact name for the silicate cements, based on their alumina (or aluminum oxid) content; namely, Aluminum-phosphate cements. He says that:

> "The essential ingredient or basic structure in all silicate cements is the aluminum oxid *(Thonerde)*, which fits them to withstand the effects of acids, with hardness, adaptability and translucency. That when the aluminum oxide is heated in a furnace to about 1,500°C, it becomes more insoluble in water and acids and almost infusible. He cites the mineral Beauxite as the source from which the oxid may be obtained. If heated too high it cannot be used technically for cement powder, and in order to control and to lower the fusing or annealing point he used fluorids, which was suggested to him by the presence of these in the tooth enamel. This gives him an annealing point of about 1,250°C. He presented some pieces of a porcelain-like material at the time of reading his paper which, when pulverized and mixed with a slight percentage of coloring matter, was the material from which he manufactured Translucin."

The L. D. Caulk Co. informed me regarding Synthetic Porcelain:

> "That this material has been in use in the United States something over two years and in Europe for a full year and a half before that time. That since it required over eight years' time of practically three men and assistants to develop Synthetic Porcelain, they are sure the inventors are not willing that the details of the composition of the powder, nor the methods of assembling them, should be given out for publication. This is true also of the Synthetic liquid. No changes whatever have been made in the product since it first came out."

I am, therefore, unable to give you either the chemical composition or technical makeup of this latter product (which is largely used) at this time; but hope to examine it more in detail later on. Should the manufacturers care to vouchsafe more accurate information about it, I believe the profession would greatly appreciate it.

To show you how little the chemical make-up of these cements has changed in the past twelve years, I shall give you the composition of one which came out about the middle of 1901 and was heralded as the long-looked-for succedaneum, the ideal tooth restorer. It consisted of a liquid which was a modified phosphoric acid and a powder composed principally of calcium and aluminum silicates. In four other analyses of different silicate cement powders that have been published by a chemist who studied them, it is shown that the main constituents are silicates of lime and alumina, with an admixture of other ingredients such as lithium phosphate, free silica, sodium borate, free lime, aluminum oxid, silicate of Beryllium and silicic acid (or anhydrid). The liquids in all cases were modified solutions of phosphoric acid.

It has been claimed for some silicate cements that they are closely allied to Portland cement and to porcelain in physical properties. If you will bear in mind the analyses mentioned above, you will see that the silicate cement powders contain mostly silicate of calcium, aluminum or Beryllium, with admixtures of such other ingredients as silica, calcium oxide, etc. Porcelain bodies are composed of silica (dioxide of silicon), giving strength; feldspar (double silicate of aluminum and potassium), giving stability and translucency; and kaolin (hydrated silicate of aluminum), giving stability of form and facilitating moulding. These, together with a flux composed of the carbonates of the alkali metals, or of oxids of lead, etc., give us our porcelain bodies and make our porcelain inlays, *when mixed in the proper proportions and fused. It is the fusing of the ingredients together with the aid of the flux that makes them into true porcelain. Grinding up porcelain or mixing together similar ingredients to those mentioned and combining them with a liquid containing phosphoric acid will not give us a porcelain such as we know it in our porcelain inlays.*

Portland cement, according to the definition adopted by the Association of German Portland Cement Manufacturers in 1903, is "a hydraulic cementing material with a specific gravity of not less than 3.10 in the calcined condition, and containing not less than 1.7 parts by weight of lime to each one part of silica + alumina + iron oxid, the material being prepared by intimately grinding the raw ingredients, calcining them to not less than clinkering temperature and then reducing to proper fineness." Hence the value of Portland cement seems to depend upon the formation, during calcining, of silicate and aluminates of lime, these, with a certain amount of free lime, constituting the active part of the cement, the other ingredients being in the nature of impurities. Besides the ingredients mentioned, magnesia and sulphuric acid are also usually present.

You will thus see the connection that exists between Portland cement, in which the liquid is water only, and silicate dental cements, in which the liquid is a watery solution of an acid modified with acid phosphates; and between the latter and true porcelain. The silicate cements seem to be allied chemically with the older oxyphosphate cements; and physically, to a certain degree, with Portland cement.

The objection to much of the trade nomenclature of the silicate cements is that the laity may be misled by the names and imagine that they are receiving true porcelain fillings. I have spent much time explaining to persons who have come to me complaining that their porcelain fillings, put in by some of my brother practitioners, had loosened or discolored, that those fillings were not true porcelain fillings, but only cement of a semi-permanent nature. This misleading of the public regarding silicate cements has been the subject of special mention in annual reports of committees and in the addresses of presidents of our dental societies. Thus, Dr. H. W. Le Febre, in his presidential address before the Colorado Dental Society, in June, 1913, says:

> "A thing to be regretted in this connection is that there is a tendency among some dentists to mislead the public by giving them to understand that this is a permanent porcelain similar to the baked porcelain inlay. This is decidedly wrong, because of the comparatively short time that the silicate cements have been used, and if they do not prove to be what we hope, it will cause a just reflection upon our veracity."

In the report of the Committee on Practice of the New York State Dental Society, for 1911, we find this:

> "The use of this material is causing much misunderstanding among our patients, as it is frequently used and called 'porcelain' filling, producing confusion with the porcelain inlay. Silicate cement has its place, also its name, and, to be ethical, let us not make the public believe that they are getting porcelain when silicate cement is used."

(To be continued.)

OBITUARY

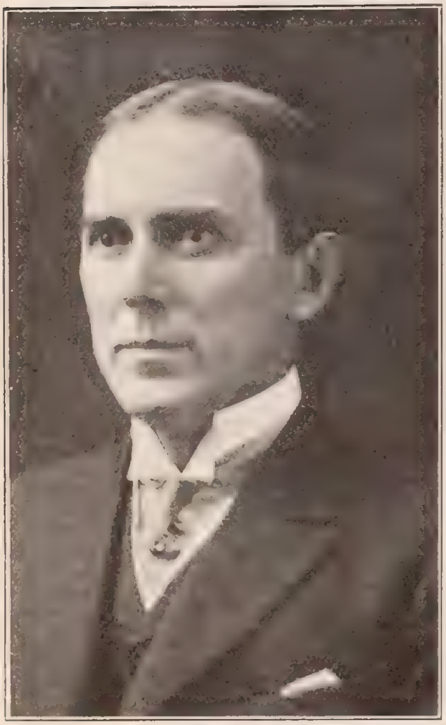
Dr. Earnest B. Stafford, of Adrian, Mich., died at Harper Hospital, Detroit, at 8 o'clock Tuesday morning, July 28th, as the result of injuries received when diving at Wamplers Lake on Sunday previous. An X-ray examination showed the neck to have been broken.

Dr. Stafford was in his fortieth year, was a successful dentist, and had the respect of all who knew him. He leaves a wife and several children.

With regret we announce the death, on July 16, 1914, of Mrs. Grace Luella Anspach, wife of Dr. F. G. Anspach, Deerfield, Mich. Dr. Anspach has the sincere sympathy of THE DENTAL SUMMARY and its publishers.

NEWS and OPINIONS

Men Who Are Making Dental History



HOMER C. BROWN, member of the following organizations: National Dental Association;; Ohio State Dental Society; Northern Ohio Dental Association; Columbus Dental Society; Panama-Pacific Dental Congress; National Dental Research Commission; Ohio State Board of Health; American School Hygiene Association (member of Council of same), and Race Betterment Congress.

Honorary member, West Virginia and Georgia State Dental Societies.

Associate member, New York First District Dental Society and Columbus Academy of Medicine.

Ex-member, Columbian Dental Congress (1893); Fourth International Dental Congress (1904); Lewis and Clark Dental Congress (1905); Jamestown Dental Congress (1906); Fifteenth International Congress on Hygiene and Demography (1912), (delegate from Ohio to same), and Fourth International School Hygiene Congress (1913), (delegate from Ohio to same).

Special Lecturer on Oral Hygiene, Ohio State University, College of Medicine.

Special Lecturer on Ethics, Economics and Practice, Ohio State University, College of Dentistry.

Consulting Dentist, Children's Hospital.

Born September 4, 1868, on a farm at Mercer's Bottom, W. Va. Parents moved to Swan Creek, Ohio, while subject of this sketch was three years old. Spent early years on farm, attended country schools and secured teacher's certificate, but never taught.

Commenced the study of Dentistry in a dental office at Gallipolis, Ohio, July, 1888, and entered the Ohio College of Dental Surgery in September. Graduated from same college March 12, 1890, receiving first honorable mention in final examinations.

Bought out preceptor at Gallipolis and took charge of office April 1, 1890.

Joined the Ohio State Dental Society in 1891. Served on various Committees and was Chairman of Executive Committee for three years and a member of the Legislative Committee for nine years, seven years of this time as Chairman. Was President, 1907, and strongly advocated a reorganization of the Society, which was approved and a new Constitution and By-Laws, previously prepared, was unanimously adopted.

Moved to Columbus, January, 1902, and immediately joined Columbus Dental Society and served as President in 1906.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXIV OCTOBER, 1914 No. 10

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The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

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REGULAR CONTRIBUTIONS

MINOR ORAL SURGERY.*

BY CHAS. K. TETER, M.D., D.D.S., CLEVELAND, OHIO

MODERN DENTISTRY includes not only the restoration of lost teeth and tooth structure, but the special treatment of any abnormal or pathological condition of the mouth. To meet the progress that has been made in dentistry within the last fifteen or twenty years, new fields of operation have been opened which require of the dental surgeon special training and natural qualifications.

There are some dentists in our profession who are so qualified that they can successfully meet all conditions of the average patient, but some of us are more skilled in certain lines of work than in others.

In keeping with the progress of the age, that of specialization, dentistry has its established specialties in Orthodontia, Prophylaxis or Oral Hygiene, Prosthesis, Anesthesia, Exodontia and Oral Surgery.

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*Read before the Cleveland Dental Society, March 2, 1914.

A dentist in general practice has the legal and moral right to practice all branches of dentistry if he has the qualifications and ability to do good work, but he should not claim the moral right if he be lacking in the knowledge of the fundamental principles involved in each subject, and it is through our dental meetings—local, state and national—that we may keep apace with the advancement of the scientific research and practical methods that are being developed.

After practicing general dentistry for a number of years, I selected as a specialty extraction of teeth, minor oral surgery and anesthetics, as the surgery of dentistry appealed to me more than general dentistry.

All are more or less familiar with the anesthetic phase, as that has been presented many times, but this is the first time I have had the pleasure of presenting the surgical part of my work.

With the aid of slides, showing practical cases, I hope to place before you the class of oral surgery that naturally comes before the dental surgeon. I wish to emphasize the gravity of these operations and the necessity of a thorough understanding of the abnormal and pathological conditions involved.

UNERUPTED AND IMPACTED TEETH.

First we will take up some interesting cases of unerupted and impacted teeth. The removal of such teeth is a surgical operation and not simply the extraction of a tooth. Failure to recognize this fact and the failure of observing the fundamental principles of surgery in regard to asepsis, sterilization, drainage and after-treatment is sure to result in a serious condition and a very dissatisfied patient.

Before operating on such a case, instruction should be given in regard to the bowels and diet. A cathartic should be given in the morning previous to the day of operation and a light diet ordered. No food of any kind should be taken for at least six hours previous to the operation. I do not find it necessary as a rule to administer a pre-anesthetic narcotic, but there are exceptional cases where this is advisable, such as extremely nervous and apprehensive patients or strong, vigorous men, especially if such men are alcoholic or inveterate smokers, the latter often being more difficult to control than the former. A general anesthetic is used, all the work being done while the patient is under Nitrous Oxid and Oxygen. The preparation of the mouth consists of cleaning teeth and gums, first with peroxide of hydrogen used in the atomizer, then wiping the gums around the field of operation with alcohol followed by tincture of iodine.

The after-treatment consists of washing out the cavity with an antiseptic solution, sufficient amount being used to remove all particles of bone-dust caused by the surgical bur. The cavity is then wiped out with gauze saturated with campho-phenique. All infected cavities are packed with sterile gauze, this being removed every 24 hours, and the cavity thoroughly cleansed with suitable antiseptic solutions, a large amount of irrigation being done by syringes or spray bottles. In clean cases it is not always necessary or advisable to pack the cavities, though I have regretted many times that I did *not* pack, but never had the occasion to regret having done so. If the wound is such that it will not close over and may readily be cleansed by the patient, there will be no need to pack it, but such conditions are rarely found.

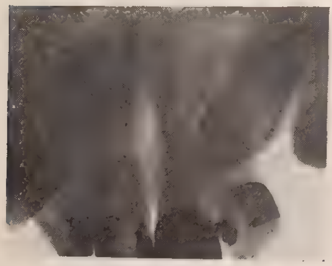


Plate 1.

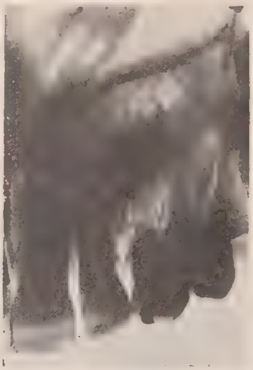


Plate 2.

Plate 1. I will now present a case of an unerupted and impacted upper right cuspid tooth, lying in the lingual process. This patient was a man about 40 years old and had suffered with neuralgia for many years. Drs. Hill and Thomas made the discovery of the impaction. Two weeks after its removal the patient's neuralgia ceased. The technic in the removal of this tooth consisted of an incision being made in the lingual surface of the gum, about one-fourth inch above the neck of the right incisor, extending distally to the second bicuspid, keeping close to the necks of the teeth to avoid the anterior palatine vessels and nerve. The gum and periosteum were then separated from the palate bone until the field over the imbedded tooth was exposed. The overlying bone was removed with a surgical bur. There was not much space between the teeth and the impacted tooth, so most of the drilling was done above the impacted tooth. After the bone had been removed, an elevator was inserted

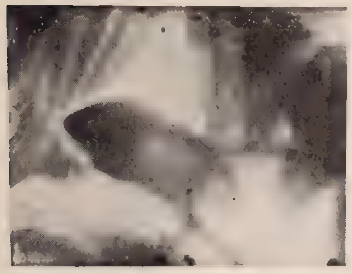


Plate 3.

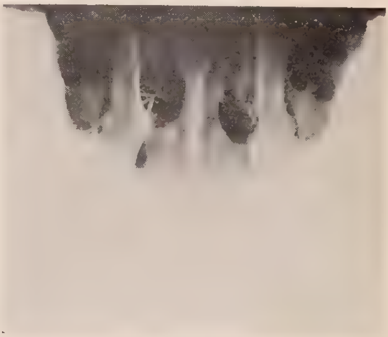


Plate 4.

beneath the tooth and it was dislodged by forcing it upwards into the space created and easily removed.

Plate 2 is a similar case, being an impaction of the upper right cuspid also but lying much higher in the palate. The temporary cuspid is still in place. Age of patient, 28 years.

Plate 3 shows another badly impacted cuspid, tissues become infected, resulting in an extensive suppuration and carious condition. Upon the removal of this tooth and carious bone, a large opening into the antrum was found. The antrum contained pus but no granulated tissue of polypi. The cavity was thoroughly irrigated each day and loosely packed with sterile gauze. The wound completely closed in three weeks.

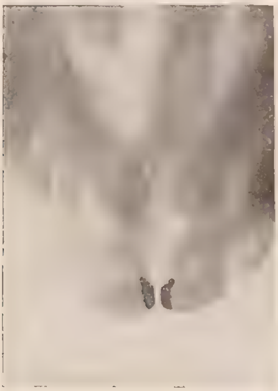


Plate 5.

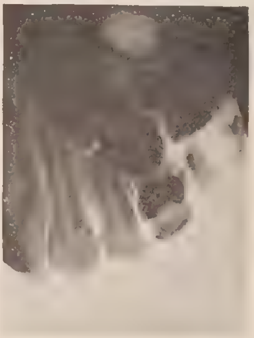


Plate 6.

Plate 4. This is a case where both upper cuspids are unerupted but not impacted. This patient's upper arch was well formed, having no vacant spaces. The teeth were removed because of their abnormal position and the bothersome bulging of the palate. An incision was made close to the necks of the incisor teeth and extended posteriorly for about three-fourths of an inch. The gum and periosteum loosened from the bone over the unerupted teeth. The overlying bone was removed with a surgical bur. It was necessary to do most of the drilling to get under the teeth distally on account of the proximity of the anterior palatine foramen. After the removal of the bone, the teeth were dislodged with an elevator. These cavities were not packed but were thoroughly irrigated every day for about one week.

Plate 5. This is a case that the late Dr. Henry S. Upson brought to me and was operated upon for the relief of nervous disturbances. This was one of my most difficult cases, on account of the size of the teeth and the position they occupied. These teeth were lying in the vault of the palate and caused a bulging of the floor of the nasal cavity. They might have been removed with less difficulty by operating in the nasal cavity instead of the mouth. An incision was made on both sides, about one-half inch above the margin of the gum, directly back of the lateral incisors,

extending posteriorly for about three-fourths of an inch, gum and periosteum freely loosened and bone removed. It was necessary to remove a considerable amount of bone before these teeth could be dislodged. A considerable portion of the floor of the nasal cavity was removed, but the wound was clean and healed without complications. I regret that I cannot state whether the patient's nervous condition was improved, as the patient was from Philadelphia and I have not seen her since I dismissed her after treating her two weeks.

Plate 6. This is an interesting case of impaction of three teeth in a child 14 years old. The temporary cuspid, first temporary molar and roots of the second temporary molar are in place. The first bicuspid is locked between the cuspid and second bicuspid. The operation in this case consisted of extracting the three temporary teeth and the removal of the second bicuspid. The remaining bicuspid and cuspid erupted naturally in four months.

Plate 7.

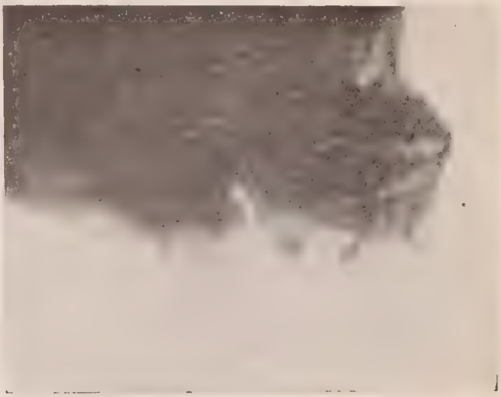


Plate 8.

Plate 7. Case of an impacted upper second bicuspid in a child 13 years old. This tooth was removed.

Plate 8. This is an impacted lower left second bicuspid, the removal of which was very difficult, owing to its position, lying crosswise in the jaw, the root in the lingual surface and the crown on the buccal. The lower part of the tooth formed the upper wall of the mental foramen. The bone above and partially around the tooth was removed on both the lingual and buccal surfaces, care being necessary not to injure the mental vessels and nerve. It was necessary to cut through the tooth, separating the crown from the root. This was done with a surgical bur, cutting lingually on the first molar. The root was then dislodged with an elevator and the crown forced out with a chisel and mallet. There was some bruising of the mental nerve and the patient complained of a numbness and stinging sensation of the lower lip. This condition cleared up, however, in about ten days. This wound was packed each day for about two weeks,

after which time the patient was able to keep the wound clean until it was entirely healed.

The most frequent cases of impaction of teeth met with are the lower third molars, and the removal of these teeth is usually much more difficult than other impactions, because of their inaccessibility and the density of the bone in which they lie. Not all third molars that do not erupt are impacted. They may be in a crowded condition and because of such condition and the resistance offered by density of the bone, fail to erupt. These conditions often are the cause of more discomfort than that caused by impaction, and the removal often presents more difficulty than that encountered in the removal of an impacted third molar, as shown in plates 8A and 8B.

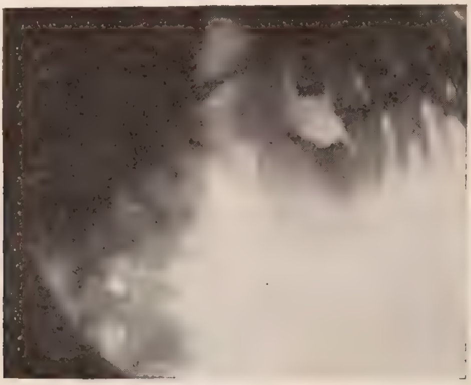


Plate 8A.

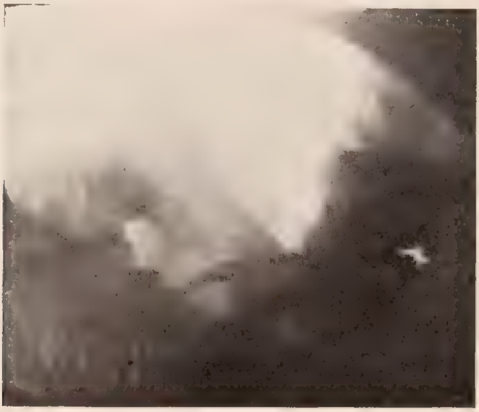


Plate 8B.

My technic for the removal of unerupted, crowded and impacted lower third molars is as follows: An incision is made in the gum tissue, starting on the buccal side of the jaw, about one-half inch below the margin of the gum, beneath the center of the second molar; this is brought upward and backward to the center of the jaw about one-fourth of an inch distal of the second molar, carrying it distally for about one inch, which will extend it well up the ramus. Then the gum and periosteum are loosened from the bone; the flap thus formed is held back by means of suitable retractors. We now have the bone well exposed over the imbedded tooth. A large inverted cone surgical bur I have found most efficient in removing the overlying bone. I commence the drilling about three-fourths of an inch distally of the second molar in the median line of the jaw, pulling the drill forward to the distal surface of the second molar and deepening it until contact with the imbedded tooth is secured. Then the bur is carried to the distal end of the groove and again drawn forward, cutting off the bone towards the lingual surface. This operation is continued until the lingual plate is reached. The drill should never be allowed to cut through the lingual plate. If it should, the lingual and mylo-hyoid vessels and nerves are apt to be injured. It is not necessary to disturb the lingual plate at all. By the use of the bur the bone is removed buccally, carrying the bur well under the imbedded tooth and extending from the distal surface of the second molar to near the ends of the roots of the imbedded tooth, being careful not to allow it to enter the inferior dental canal.

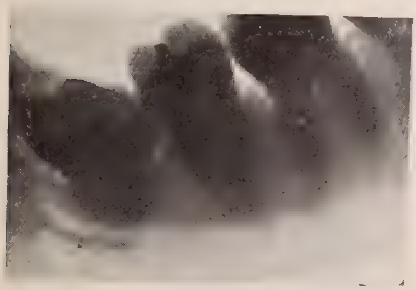
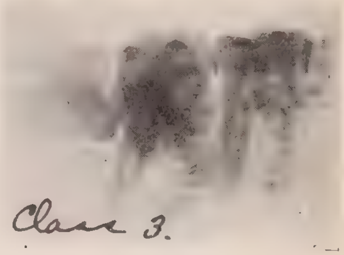


Plate 9.



Class 3.

Plate 10.

If the removal of bone has been done thoroughly, the dislodgment of the tooth is a simple matter. An elevator is placed under the tooth if it is lying down, or if standing up the elevator is placed in front of the tooth and the tooth may be dislodged. If a considerable amount of force is necessary to dislodge the tooth, it is better to create more space, for the jaw being weakened by the removal of so much bone may be fractured by the use of undue force.

I have never found it necessary to do any of the preliminary work under a local anesthetic, nor have I found it advantageous to grind off the end of the impacted tooth. The enamel being so hard, this is very difficult at best and if the tooth lies deeply under the bone, it cannot be done without injury to the soft tissues of the mouth and usually more or less injury to the second molar. If after the removal of the overlying bone distally and buccally the tooth may not be removed on account of its position being at such an angle that the crown may not have sufficient space to make the upward circle, my method in such cases is to sever the roots from the crown with a bur, which is much more quickly and easily done than grinding off the enamel. After the roots are severed from the crown, both are easily removed with an elevator.

The after-treatment in these cases is very important, otherwise grave complications will result. If these cavities are not thoroughly cleansed, they will become veritable cesspools of decomposition and micro-organisms. If much pain is present, I saturate the packing gauze with euroform paste or dentalone.

I will now present a number of slides of such impactions:

Plate 9. A lower left impacted third molar, lying at right angle to the second molar. As you can see, the crown of the tooth is not covered with process but was beneath the gum.

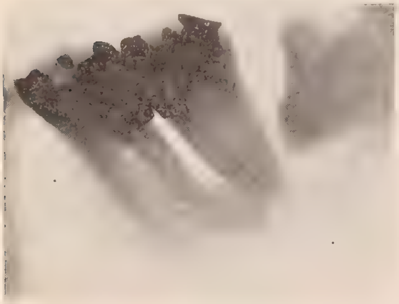


Plate 11.

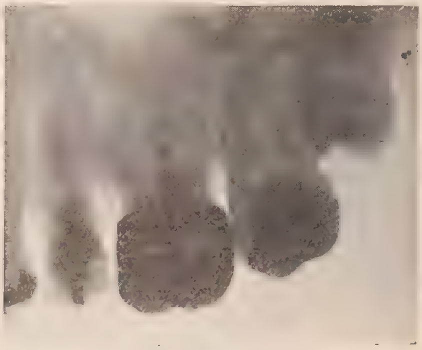


Plate 12.

Plate 10. A lower left third molar, lying horizontally in the jaw, almost entirely covered with bone. It was necessary to sever the roots from the crown in the removal of this tooth. Length of complete operation, including the inducing of anesthesia, was 20 minutes.

Plate 11 shows an original impaction, but the impaction had been relieved by the result of suppuration. There was a carious condition of the bone surrounding this tooth.

Plate 12 shows an upper third molar impacted. These teeth usually present much less difficulty in their removal than the lower. The process is readily removed with bone forceps and the teeth dislodged with elevators or forceps. Plate 12A is an exception to this rule.

Plate 13. An upper right third molar impacted and completely covered with a thick layer of process.

Plate 14. An upper left third molar unerupted but not impacted. It was removed in an effort to relieve neuralgic pains, but you see evidence in this case of the necessity of further work in the root canals of the buccal roots of the first molar before results could be expected.

Plate 15. This slide shows all four third molars badly impacted. The patient was a young man, 24 years of age, sent to me by Dr. John A.

Monroe, of Saranac Lake, New York, November, 1912. This patient had suffered with paroxysms of pain in his head for a number of years. Complete relief from the pain was experienced ten days after the teeth were removed.

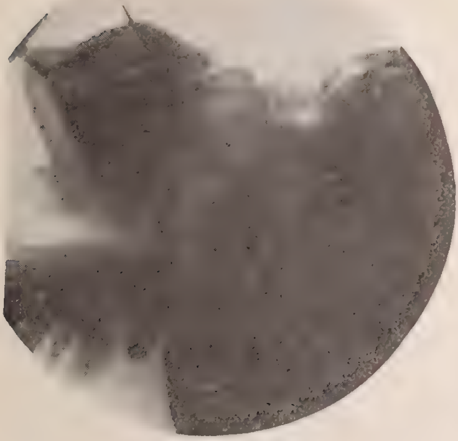


Plate 12A.

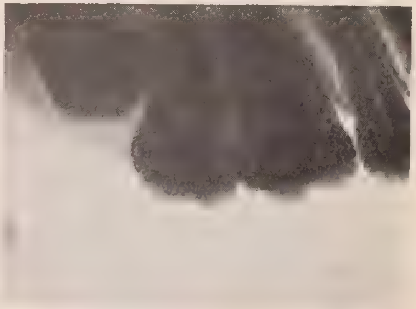


Plate 13.

Plate 16 shows an impaction of the upper and lower right third molars.

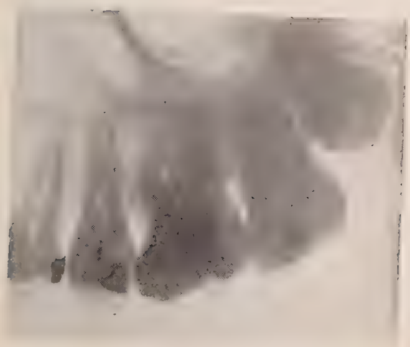


Plate 14.

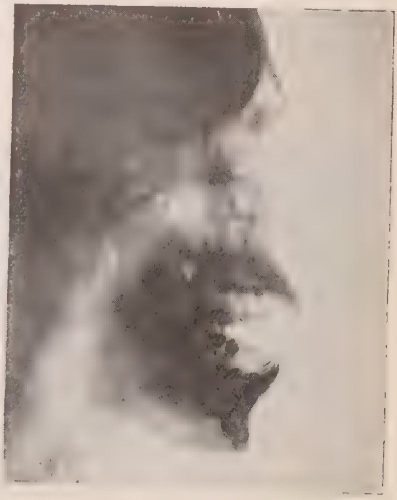


Plate 15.

Plate 17. A very interesting case, with impacted and imbedded third molars. This patient was about to undergo an operation on the Gasserian ganglion for the cure of ticdouloureux. The removal of these teeth afforded a complete cure as they were the cause of the nervous phenomena.

Plate 18. This is an impacted lower third molar. Three previous attempts had been made to remove this tooth. The patient stated that the bone around the tooth had been removed eight months previous by a specialist in Columbus, but I found the tooth almost covered with bone of unusual density. Either this had not been removed or new bone had formed within that time, the latter condition being probable.

Plate 16.

Plate 17.

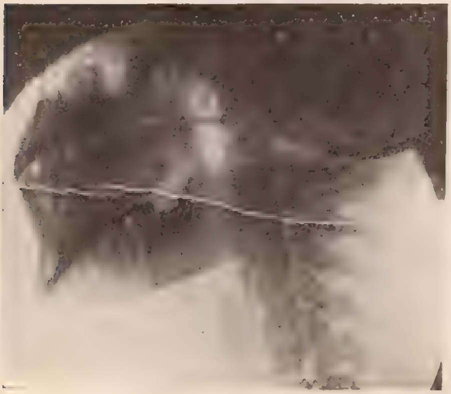


Plate 18.

Plate 19.

INFECTION AND NECROSIS.

Another condition frequently met with in the mouth that calls for surgical intervention and treatment is caries and necrotic conditions. The exciting and primary causes of this condition being so numerous and generally understood, I will omit the detail but give a few of the most interesting and serious cases that have come under my observation and care.

By necrosis we mean the death of bone *en masse*. Generally speaking, any dead tissue is necrotic, but the term necrosis is usually applied to distinguish from sloughing gangrene or death *en masse* of soft tissue. A carious condition is distinguished from a necrotic condition in that it is a molecular destruction of bone. A similar condition affecting the soft tissues is called an ulcer.

One of the most distressing conditions of caries of the bone and ulceration of the gum and soft tissues that has come under my observation, was that produced by arsenic. This was caused by careless application of arsenical paste for the devitalization of the pulp in an upper right cuspid. I was called five days after the treatment had been inserted and found the patient suffering intensely. The face was swollen to such an extent that both eyes were closed from the edematous condition. The lips were greatly thickened and the gums were swollen, sloughing and bathed in pus. The right central and lateral incisor, cuspid, first and second bicuspid and first molar were loosened to such an extent by the powerful escharotic action of arsenic that they came from their sockets when the mouth was opened and an attempt was made to establish drainage. The carious bone was removed by curretting and the sloughed tissue was cut away. The cavity was thoroughly washed out with normal saline, tincture of iodine was applied to the gums and in the wound, and the cavity was packed with iodoform gauze. This was removed the next day, the wound cleansed and repacked with carbolated gauze. Inflammation rapidly subsided and complete healing readily took place. I regret that I was not able to secure a radiograph of the case.

PLATE 19. I wish to report a case that I had recently, which shows to what extent the general system may be involved from a local infection of the mouth. This patient was brought to me February 3d by Dr. Frantz, of Alliance, and was accompanied by his physician, Dr. Morgan, as well. The physician gave me the following history of the case: An abscess developed around the upper right central incisor last December, following the removal of a dead nerve. This abscess did not respond to the usual treatment but spread rapidly. Both central incisors and right lateral incisor were extracted but the necrotic condition continued and secreted pus freely. Metastatic extension took place and a large abscess developed under the right arm and another at the right elbow. When I saw the patient, all metastasis had ceased and the only condition remaining that called for treatment was at the seat of the original infection. I found, upon operating, a large sequestra of bone extending from the left lateral incisor to the right first bicuspid. This was readily removed, but there was also present carious bone and pathogenic tissue. It was necessary to remove the right cuspid, as the carious condition extended around this

tooth and also the anterior wall of the antrum. All diseased tissue was removed until healthy bone was reached, cavity irrigated and packed with gauze. Dr. Frantz reports a satisfactory progress in the healing of the wound. The patient and the physician claim that the original infection came from a dirty broach which was used in the root canal of the central incisor. The physician stated that a dentist used a broach in this tooth which he had previously used on another case. The only method of cleansing used was that of holding the broach on a wire brush, which revolved on the dental engine, to remove cotton which was adherent to the broach.

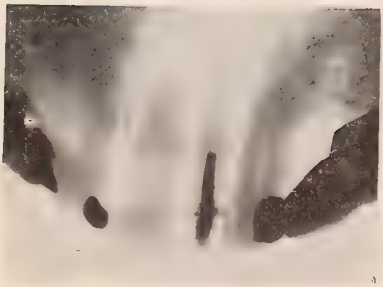


Plate 20.

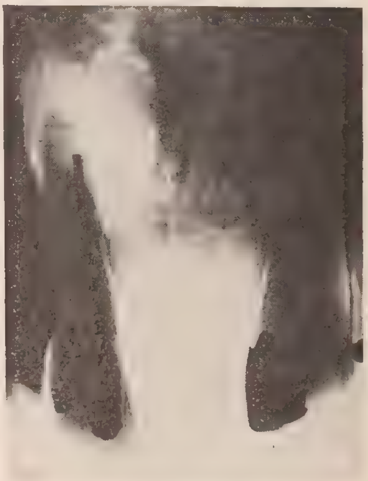


Plate 21.

Plate 20. This slide shows an extensive carious condition, due to infection from the lateral incisor. The central incisor and cuspid contained dead pulps, probably the result of the extensive carious condition around the teeth. The lateral was extracted and the roots amputated on the other two teeth, the root canals subsequently filled, the carious bone removed, wound packed and the same treatment carried out as given in the previous cases.

Plate 21. This slide shows an abscessed upper left central and carious condition of the bone, due to an improperly filled root canal. This tooth was extracted and diseased tissue removed by curretting.

I wish next to show a few original cuts to illustrate the operation for the correction of superior protrusion of the process. This operation is often indicated in edentulous mouths where there is extensive protrusion of the process that would make it impossible to fit a satisfactory denture.

Plate 21A. Having had a number of such cases, and the results being highly satisfactory to all concerned, I wish to call attention to the subject and explain the technic of the operation. It is assumed that at least all the eight anterior teeth have been removed or are in such condition that their removal is indicated.

PLATE 21 B. An incision is made on the ridge of the process, the length of the incision depending upon the extent of protrusion, but generally it is from the region of the first molar on one side to the same position on the opposite side. The gum and periosteum are then loosened freely from the buccal and labial surfaces, the separation extending upwards, until all the process is exposed.

Plate 21A.

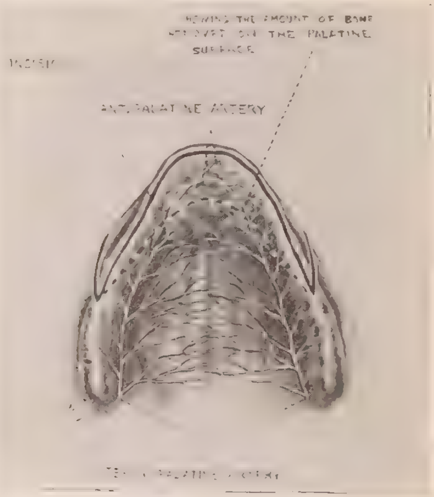


Plate 21B.

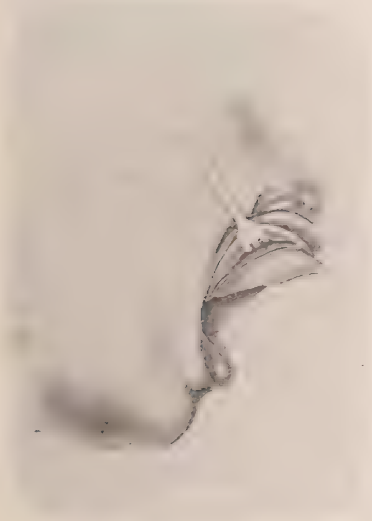


Plate 21C.

Plate 21D.

PLATE 21 C. The tissues are also separated from the process on the palatal surface, care being given that the vessels lying on this surface

and those passing through the anterior palatine canal are not injured. Having the gum and periosteum freely separated, this may be held back with suitable retractors, as shown in Plate 21 C. The process is removed with a chisel, mallet and bone forceps. An outline of the process to be removed is made with a straight chisel, cutting only through the outer plate of process, extending from the bicuspid region from one side to the other (Plate 21 B). The point of the chisel is then placed on the ridge of process and by the aid of the mallet is driven into the process for about one-fourth of an inch. This is repeated until the fissure thus made is extended to the edge of the fissure that circles over the outer plate of the process. It should now be very easy to pry the outer half of the process loose, removing it practically *en masse*. The process on the palatal surface is removed with bone forceps, it being necessary to dissect away the bone carefully from around the anterior palatal canal, exposing the anterior palatal and naso-palatal vessels and a considerable portion of nerves. These vessels will be exposed but when they are covered with the periosteum and gum they eventually contract and give no trouble.

Plate 21 D. Before closing the wound, all bone surfaces should be left smooth, then the excess gum is cut away to make a good approximation. Interrupted sutures of a silk or plain cat gut should be inserted every half inch. These may be removed one week later. The patient is instructed to keep the mouth clean by using suitable antiseptic mouth washes. These cases need no further treatment, for as a rule the gums heal more rapidly than they do after ordinary extraction.

TUMORS OF THE MOUTH.

No attempt will be made in this paper to classify the tumors of the mouth or to consider their special etiology.

Tumors of the gums, alveolar border and jaws, I have found very interesting and the surgical treatment has been most satisfactory. The tumors of the gums and alveolar border are usually spoken of as epulis, but there are numerous varieties of epulis, including the simple, fibrous and papillomatous outgrowth from the gums, which are usually small and may be cut away with scissors; also other varieties of growth, such as fibroma, angioma, chondroma and malignant.

The early and complete removal of these growths is the only treatment. No delay should be permitted in any form of epulis, as continued irritation increases the growth which has no tendency to spontaneous cure. The early operation often prevents return and malignant degeneration. A recurrence will depend to a great extent upon the thoroughness of the first operation.

Teeth should be sacrificed if their retention should interfere with the complete removal of the tumor and its attachments. The following case will illustrate the importance of early and complete extirpation. The case was under the care of my brother, W. C.:

The patient was a woman, 35 years of age. He first saw her August 20, 1912. There was a small papillomatous growth attached to the periosteum, distally of the upper central incisors. This growth had been removed previously by simply cutting off the pedicle. On the above date, W. C. removed it by making a triangular incision through the gum and periosteum and cauterized it with nitrate of silver. The cavity filled in rapidly and as he had a report from the pathological laboratory of giant cell sarcoma, recurrence was expected, which took place within a few days. A consultation was held with the family physician, November 1, 1912, and the tumor was removed again as before. The gums and mouth were treated prophylactically by W. C., and the patient treated systemically by Dr. T. A. Burke. A recurrence took place again and a pathological examination was made at Charity Hospital, reporting giant cell sarcoma, the same as the first report made two months previous. Dr. W. C. operated the third time, assisted by Dr. Burke, January 11, 1913. The four superior incisers were extracted, all process removed with bone-cutting forceps and the soft tissue extensively cut away. The cavity was irrigated and packed each day for about six weeks. Granulations gradually filled in and a complete healing of the wound took place in about ten weeks. No recurrence has taken place to date.

Plate 22.

Plate 23.

It is my usual policy to have a laboratory examination made of all epulis and if malignancy is reported, to operate more extensively, if there is a recurrence of the growth. If the malignancy has involved the surrounding tissue and there is glandular and lymphatic involvement, such cases should be referred to the surgeons of acknowledged skill and long experience in major surgery of this character. An extensive operation may be necessary that would require the complete removal of the mandible, maxilla and glands of the mouth and neck.

A form of tumor frequently met with in connection with the maxilla and mandible is the cystic tumor. These cysts in the mouth are usually of two kinds, those that are inflammatory in character and begin at the root of a diseased tooth, within the peridental membranes and the so-called dentigerous cyst. These growths originate from the inner surface of enamel covering of the tooth, during its development, and usually the tooth or fragments of the tooth are in the cystic cavity.

Plate 22. This case was a young woman, 18 years of age, sent to me by Dr. Whiteside, of Youngstown. This is a so-called dentigerous cyst, originating probably from the inner surface of the enamel covering of the second molar, during the development of this tooth. The tooth you can see has fallen into the cavity and is beneath the first molar. The third molar, only partially developed, may be seen in the back part of the cyst, near the lower border of the mandible. This cyst was quite large, an inch and three-quarters long and about one inch wide. It was encroaching upon the tongue, and the upper teeth coming in contact with the upper surface of the tumor was causing irritation. The operation for the removal of this tumor consisted of extracting the first molar, then an incision was made distally from the first molar to the ramus of the jaw, the gum and periosteum were freely separated from the tumor and the cyst partly removed *en masse* before it ruptured. After it ruptured, the membrane was removed with currettes. Both of the teeth were inside the membrane. The walls of the cavity were very thin and were obliterated with bone forceps. After the removal of the wall, there was but a very thin layer of bone left that connected the ramus to the rest of the jaw anteriorly. Excess gum tissue was removed, the cavity thoroughly irrigated and loosely packed with carbolated gauze. Length of operation, 30 minutes, under nitrous oxid and oxygen. The patient left the office within three hours. Eight months after this operation, I saw the patient again and new bone had filled in and formed a perfectly shaped mandible.

Plate 24.

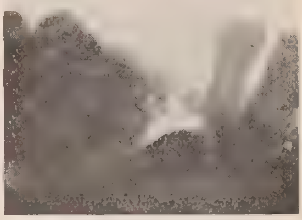


Plate 25.

Plate 23. This slide shows another dentigerous cyst located at the angle of the mandible on the left side. This patient was a man, 25 years of age. He had been cognizant of the growth for about five years. The cyst extended well into the ramus and anteriorly to the first molar, lying buccally. The third molar was lying practically horizontally in the cyst,

the crown being towards the ramus and the tooth lying buccally of the second molar. It was not necessary to remove either the second or first molars in this case in order to completely remove the tumor. This tumor was removed in 20 minutes.

PLATE 24. This is another dentigerous cyst, in the right mandible, beneath the third molar.

PLATE 25. In this slide we have a case that is very unusual. It is a multilocular cyst, in the maxillary bone in the region above the cuspid and bicuspid teeth. This cyst was formed in connection with the follicle of the upper left first bicuspid tooth. The special interest in this case was the fact that the cyst was composed of numerous cavities and not only contained serous or mucoid fluid, but contained also a large number of small pieces of tooth structure, the size of a grain of rice. These small pieces were composed of imperfectly formed enamel, denture and cementum, and were so numerous that the cavities were almost completely filled. The tumor was approximately an inch and one-half long and one inch wide. W. C. performed this operation and I assisted as best I could with a fractured arm. This case was also referred by Dr. Whiteside.

Plate 26.

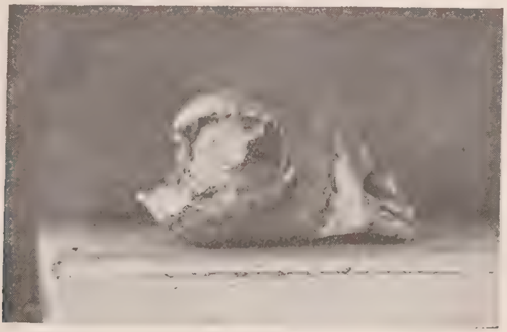


Plate 27.

We extracted the second bicuspid, the roots of which were partially absorbed by the pressure from the cyst. The process was removed with bone forceps and the cyst extirpated with currettes. The cuspid was not removed, as it was outside the cyst, and an effort was made to bring this tooth into its proper position, which was successfully accomplished later.

PLATES 26, 27, 28. These three slides are presented to show a rare condition of a tooth tumor. This patient was referred by Dr. G. W. Greene. The tooth involved is a lower left lateral incisor. The proper classification of this growth is uncertain, but I believe it to be a radicular odontoma. These tumors form after the development of the crown and during the process of root formation. They consist of cementine and dentine in varying quantities and are rarely found in man but frequently in animals. A suppurating condition was present, the bone being very slightly involved and the removal of the tooth left a smooth cup-shaped cavity. The extended sides of the cavity were removed with bone forceps and the wound readily healed under Dr. Greene's supervision.

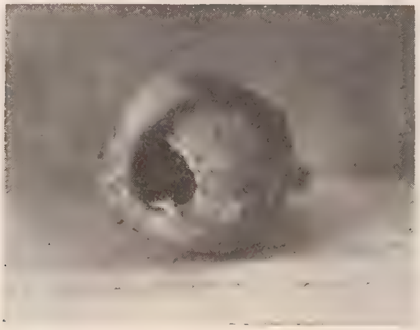


Plate 28.

In conclusion I wish to emphasize the necessity of the observance of well established surgical principles in all cases, whether it be for the removal of minor impacted teeth or more extensive operations, and to impress upon the dental profession a more thorough understanding of the gravity of these operations that are usually underestimated. Also the educating of the laity of the important and ofttimes serious nature of these abnormal conditions.

Permit me to call your attention to the radiograph as being an essential requisite in making a correct diagnosis, as well as indicating to the operator at once a definite method of procedure.

The Maiden Wheeze

Elevator passengers in the Ware building, in Omaha, have canned the call "second" when they are seeking the large dentists' offices on that floor. Instead they call painfully, "Two-th!"— *W. B.*

Self-reliance means strength, but egotism and foolish boastfulness is only a confession of weakness.

ROSIN SOLUTION IN ROOT FILLING*

BY DR. J.R. CALLAHAN, CINCINNATI, OHIO

℞ Rosin .... gr. xll
Chloroform .... ʒij
M. Fiat sol.

Colophony, resin, commonly known as rosin, is obtained from turpentine by distillation. In the process the oil of turpentine comes over and the rosin remains behind. Rosin varies in color from dark red-brown to black or white, according to its purity and the degree of heat used in its preparation. Chemically, it is the anhydrid of abietic acid. It has the physical and chemical properties common to all resins. It softens at 176 degrees Fahrenheit and fuses completely at 275 degrees Fahrenheit; is insoluble in water; with difficulty is soluble in alcohol; freely soluble in chloroform, acetone, benzone, and fatty oils.

The rosin that is best adapted to dental uses that I have been able to find is that prepared by Bernardel for the use of the violinist, a French preparation very near the color of dentin. The formula as given above makes a very thin solution. It required a long time for me to realize the advantage in the use of a thin solution. A thick mixture will not penetrate the tubules, nor does it give up enough chloroform to dissolve the gutta-percha.

You will agree with me in three statements:

First—That thermal changes due to the presence of large metallic fillings in tooth cavities excite conditions that cause the untimely death of many tooth pulps.

Second—That pulp capping has ceased to be a regular procedure in many offices.

Third—That a thoroughly satisfactory root-canal filling has not yet been proven.

It is my desire to discuss the use of a solution of rosin in chloroform in our treatment of the class of cases that the three statements suggest.

A moment's consideration of the three divisions indicate that we are to deal with dentin that has been subjected to infection. Therefore, a brief rehearsal of the histological anatomy of dentin will aid us in getting our mental eyes in the same focus.

Arthur Hopewell Smith in his late book, "An Introduction to Dental Anatomy and Physiology," says: "The functions of dentin are to give substance to the tooth itself; to provide a center of sensation; to protect the pulp. Enamel is without the pale of nutrition. The pulp is highly vitalized and the dentin is on the borderline of the living and the dead: semi-vitalized, if one may so speak.

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*Read before the Rehwinkle Dental Society, Chillicothe, Ohio, February, 1914.

"Nature would not for a moment tolerate the presence in the midst of living tissues of a dead body like enamel. The result is, therefore, the presence between the living pulp and the inert enamel of a large area, relatively speaking, of a tissue which is marvelous and unique. In no other part of the body do we find an entirely tubular structure like dentin. Its peripheral parts where it joins the inorganic enamel and cementum are less vitalized than its central parts. This explains the reason why the dentinal tubules are not of the same caliber throughout their lengths. They vary from 1.7 micron to 5 microns. The diameter of the tube diminishes as it proceeds outward, until at the peripheral region of the tooth it becomes immeasurable. The dentin of the crown of teeth is more plentifully supplied with living material (protoplasm) than the roots; hence the tubes branch more frequently in the latter than in the former situation. The tubes carry the dentinal fibrils; that is, the peripheral poles of the odontoblasts."

It is through these dentinal fibrils that nervous stimuli are transmitted to the pulp. Following the teachings of Miller and Black in the study of carious dentin, we note among other interesting things that caries progresses along the lines of the dentinal tubuli; that the form of the disintegrated dentin is that of a cone with the apex toward the pulp chamber, and that the dentin is decalcified in advance of the penetration of the micro-organisms.

It is not likely that in the preparation of cavities we *always* remove the apex of the affected dentin. In deep-seated cavities is it advisable? In spite of the application of strong antiseptic agents recurrent decay may develop, and toxins finally reach the pulp.

If the remaining traces or thin layers of decayed dentin can be thoroughly dehydrated, the application of rosin solution may be of great service.

First, rosin being more or less a non-conductor, it reduces the shock of thermal changes, thereby lessening the tendency to secondary growths or deposits within the pulp chamber that are so noticeable under large metallic fillings, especially under large gold inlays.

We are taught that the decalcified dentin that is to be found just in advance of the micro-organisms in carious dentin furnishes food for the invading host. If the remaining decalcified dentin be saturated with rosin, I imagine the cost of living in that region will become prohibitive. However, if the rosin solution reaches the farthest boundaries of the decalcified dentin through the infected area, then the micro-organisms within the tubuli will have been engulfed within the rosin solution, and unless the bacteria are able to liquefy the rosin, they will be forever inhibited from further activity, be they aerobic or anaerobic, in active or spore form. I need only mention the antiseptic properties of the chloroform.

This you will admit would be a very desirable condition in which to have a layer of decayed or decalcified dentin over the pulp, where the removal of the layer of decay would mean the exposure of the pulp.

The most satisfactory results that I have had in capping pulps has been to flow a rosin solution over the exposure, evaporating the chloroform with warm air, then cause a very thin cement to *flow* over the floor of the cavity and the thin coat of rosin and allow it to harden, being very careful to avoid pressure of any kind on the cement until quite hard.

This practice has been confined to quite small and recent exposures. Not the least satisfactory use of the rosin solution is after more or less thorough drying of the cavity and application of the rosin prior to the insertion of gutta-percha fillings either as a temporary or permanent filling.

On the removal of a temporary stopping of this nature that has been in place a week or a month, the decayed dentin that may have for any reason been left in the cavity will be found noticeably tough and hard and dry, due to the presence of the rosin, and the sensibility of the dentin will be materially less, showing that the dentin has been free from the irritating effects of acids, or, in other words, the fibrils have been in a state of comparative rest. And after all is said, the chief function of the surgeon is to remove the irritant and place the affected region at rest to the end that nature may perform a cure.

We now come to the consideration of the time-worn subject of root-canal filling. Let us not undertake to discuss the treatment of root canals preparatory to filling further than to say that no root canal is properly prepared for filling unless a fine paper canal dryer, as furnished us by the dealers, can be passed to or near the apical foramen.

In a devitalized tooth we are again dealing with infected dentin or with dentin in which the tubules will soon be filled with micro-organisms unless they be tightly sealed with a stable and compatible substance.

In a discussion read before the National Dental Association at Cleveland, July, 1911, recorded on page 218 of the official proceedings of that year, I gave the technic for filling of root canals with rosin, chlora-percha and gutta-percha cones.

The record shows this statement: "A tooth treated in this manner *out of the mouth* and made into a thinly ground slide will show that the tubuli are filled to the cementum with rosin. The canal is filled with rosin and gutta-percha, a mixture that is hard and insoluble in body fluids, does not shrink and is compatible with the surrounding tissues, as is chloro-percha."

Further along in this paper I wish to modify this statement somewhat.

In the two years that have elapsed almost constant observation and effort has produced improvement in technic and results. The improvement and better understanding of conditions is the result of having found a staining material that will carry with the solution into the tubuli and remain permanently with the rosin during the process of grinding thin sections of the dentin for microscopic inspection.

If possible, is it desirable or necessary that the tubuli be sealed?

Dr. Hermann Prinz, whom I regard as one of the foremost among our scientific research workers, said in a paper read before the St. Louis

DESCRIPTION OF LANTERN SLIDES

Fig. 1. By Dr. Black, showing the dentinal tubuli filled with micro-organisms,

Fig. 2. Another of Dr. Black's illustrations showing decay following the line of the dentinal tubules. In the preparation of such a cavity for filling, the cavity wall would not be cut much, if at all, pulpward of the line drawn on account of the proximity of pulp tissue. This would leave a considerable area of infected dentin. If, after the application of the sterilizing agent, the infected area could be made dry and then flooded with the rosin solution and the chloroform then evaporated, leaving the rosin within the tubules, it seems to me that both the dentin and the pulp would receive greater and more efficient protection against thermal changes or further microbic invasion than if the cavity were filled without such treatment.

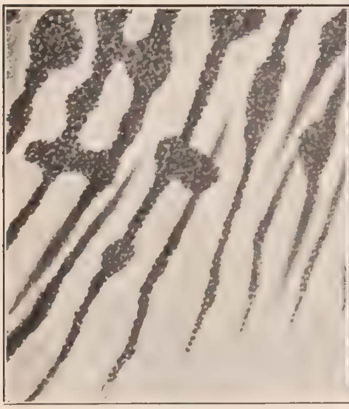
Fig. 1

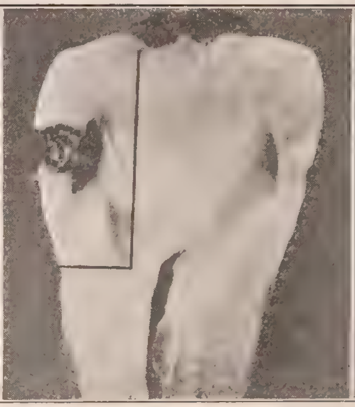
Fig. 2

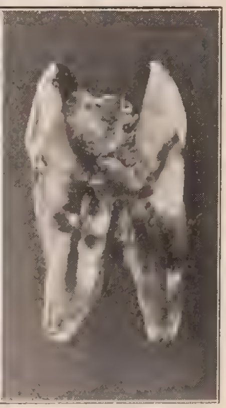
Fig. 3

Fig. 3. Shows the palatine and one of the buccal roots of a superior molar tooth, which, after having been filled with the colored rosin solution and gutta-percha cones, was ground to a flat surface, showing the filled canals and the diffusion of the rosin solution throughout the dental tubuli. This slide is selected because it is about an average specimen. These slides thrown on the screen show the rosin solution within the tubuli in blue color, the depth of the blue color depending upon the amount of rosin solution within the tubuli; the caliber of the tubules depending largely upon age and inflammatory conditions to which the tooth may have been exposed prior to the death of the pulp. This cut also shows areas in which the tubules were open to the cementum, and in the adjoining areas there seems to have been no penetration of the solution. It will be noticed that the solution always seals the pulpal or larger ends of the tubules.

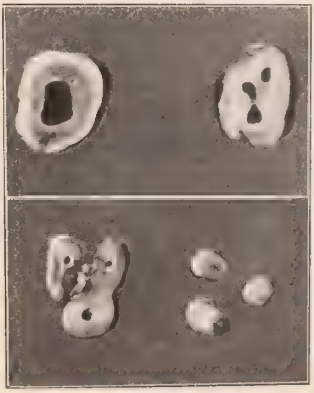
Fig. 4

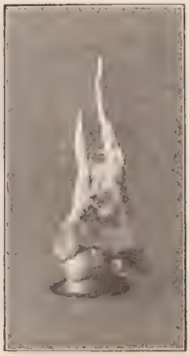
Fig. 5

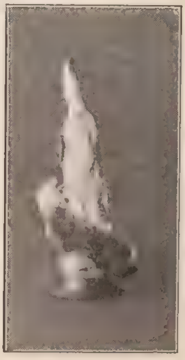
Fig. 6

Fig. 4. Transverse sections of a superior molar. The microscope shows that the dentin extends to the apical foramen in this tooth.

Fig. 5. Root canal filling of bicuspid tooth. If a root canal be filled with gutta-percha, and the tooth is then suspended in a 50 per cent. aqueous solution of hydrochloric acid, about the third day the whole tooth will be dissolved and fall to the bottom of the tube, leaving a gutta-percha model of the root canal. The same thing happens when the canal has been filled with the gutta-percha and rosin solution in combination, except that when the tooth has been saturated with the rosin solution it takes from seven to fourteen days to dissolve the dentin.

Fig. 6. Shows in detail the irregular shape of the canal of a canine tooth along the borders of the very thin fins on the right and left sides of this model; small clear beads of rosin will show in the X-ray pictures unless the rosin solution and gutta-percha have been thoroughly mixed.

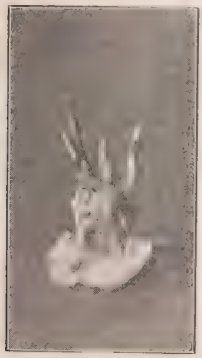

Fig. 7

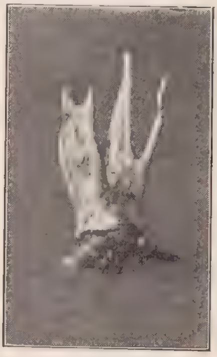

Fig. 8

Fig. 7. The root canals of superior molar tooth. In the palatine root a false pocket has been made with a drill. These canals were filled as per directions given in the paper just read. The forty to sixty pumping motions followed by the packing, with instruments, in each individual canal has caused the semi-fluid to find and fill the true canal as well as the false pocket made by the drill in the palatine root.

Fig. 8. Four canals in a lower molar. The drill did not reach the end of the fourth canal, but the filling material did. Attention is called to the gutta-percha cones that have found their way to the foramen; along the body of the canals they are surrounded by the semi-liquid rosin-chloroform and gutta-percha combination.

Dental Society, September 2, 1912: "If the canal is not filled perfectly, serum will seep into it from the apical tissues. The serum furnishes nutrient material for the micro-organisms present in the tubuli of a primarily infected root canal."

The dentin is traversed by dentinal tubuli which number from 25,000 to 30,000 to the square millimeter. The pulp in situ sends protoplasmatic processes into these tubuli, and is connected with the peripheral tissues by arteries, veins and nerves which pass through the main foramen and a number of small foramina (usually 2-7) present in the apex of the tooth. According to Fischer these accessory foramina are found in about 90 per cent. of all permanent teeth. These anatomic facts are not sufficiently emphasized at present. Their significance is of great importance for the full comprehension of the pathology of secondary infection.

In an incipiently infected root canal, these dentinal tubuli and the small foramina offer ready hiding places for various forms of pathogenic bacteria.

After exhausting the nutrient material the bacteria become attenuated or they assume restive forms. If the tubuli and the foramina are tightly sealed, these enclosed bacteria must necessarily remain permanently confined in their lodging places, while, if the root-canal filling leaks, the seepage of serum furnishes fresh material which offers excellent opportunity for their renewed activities.

By continuity this secondary infection spreads along the lines of least resistance, *i. e.,* toward the apex, and finally reaches the pericementum. This tissue protects itself against the invading foe by a reactive inflammation which results in the production of a fungus growth known as a granuloma, or, in the past, as the abscess sack or pyogenic membrane.

For years the enclosed bacteria may remain dormant. At the slightest provocation, however, overexertion, a cold, increased blood pressure, lowered vitality or some other cause, they may assume a most virulent activity, resulting in the production of the so-called subacute abscess. Based upon this supposition, we are able to furnish a plausible explanation of how these obscure secondary abscesses occur about the devitalized teeth which at one time were pronounced cured.

In one of the most profound papers given to the dental profession on mouth infection, Dr. Rhein says: "Unfortunately as a profession we must admit that most of the cases of blind abscess are the results of imperfect dental operations. In some cases they may be the result of bad judgment on the part of the operator; in others they may be due to ignorance and incompetence, but a very large number of cases are attributable to the failure of the educated dentist to give the time needed to perform an aseptic operation and have the field absolutely free from the possibility of future infection. This is absolutely nothing short of malpractice when done by a dentist who knows."

We have the testimony of several investigators to the effect that it is possible to sterilize the root canal proper, but it is an impossibility to sterilize infected dentin of a tooth while it remains in the mouth.

The microscope and the culture media have shown us conclusively that we have been, and are now, leaving enormous numbers of micro-organisms within the body with a more or less available route open to the circulatory system where they may reach any part of the body carrying destruction to those organs or parts that may offer the most attractive lodging place.

A most significant fact must be borne in mind in regard to the devitalized dentin. We have no blood current to assist in the struggle. The dentin has absolutely no power even to assist in repair. No granulation or scar tissue—nothing but an inert tubular mass infected by millions of toxin-producing micro-organisms. We must make of this infected tubular mass an inert harmless and stable body, including the effective closing of the numerous foramina, to the end that nature may be able to envelop the root mass in a healthy and vigorous peridental membrane that the tooth may serve its several useful purposes for a number of years.

Most of us have at one time or another shared in the opinion that what the root canal might be filled with mattered but little.

The radiograph in the hands of the advanced dental practitioners has brought to light evidence sufficient to prove to the dullest of comprehension the fallacy of such an opinion. It does matter as to the material: it does matter as to the manner of placing the material in the canal. The matter of prime importance being the sealing of the more or less numerous foramina, and, as we have no assurance that all the foramina in a given root canal are located near the apex, it becomes our duty to seal the whole length of each canal with a material that will search out and seal minute canals or openings that, owing to physical conditions, we are unable to see.

Have we a root-canal filling material that will meet the requirements indicated above? We have three that may be considered. Gutta-percha and chloro-percha in combination, paraffin, as advocated by Dr. Hermann Prinz and Dr. Dunning and the combination of rosin and gutta-percha. With the gutta-percha cone and chloro-percha you are quite familiar. We know of many successes as well as of many unhappy failures with this root filling, sometimes due to faulty manipulation, but often due to the fact that the root-canal filling has shrunken sufficiently to admit body fluids to the canal or permit the egress of the micro-organisms that infested the tubuli, and in addition the gutta-percha root fillings are often found to be saturated with decomposed and odoriferous substances that we are altogether too familiar with.

The paraffin root-canal filling, as advocated by Dr. Prinz and Dr. Dunning, has many attractive features, and time may prove it a most, if not *the* most, acceptable root filling. I have not always succeeded in getting the paraffin to the apex of the roots of upper teeth. If the wire is too hot the paraffin will collect about the shank of the instrument, and if not hot enough it does not flow to all parts of the canal. The melted paraffin will, however, follow the paraffin oil into the tubuli and foramina if treated properly. It will take time to prove its permanence within the body. Our previous experiences and the experience of the surgeon have made us a little shy on this point.

The technic of the rosin-gutta-percha root filling is simple, easy, quick, and sure to seal all tubuli and foramina that are open.

I have said that a root canal should be the general shape of the paper root-canal driers as furnished us by the dealers. In addition to this general form; have the mouth of each canal a decided saucer shape. This will facilitate the placing of agents or instruments to or near the apical foramen. The first step then is the complete dehydration of the dentin, using acetone, as advised by Dr. Prinz, as the dehydrating agent. After flooding the canal with acetone, use the paper points liberally until the canal is entirely free of moisture. Follow this with warm air. Then hold a warm wire in the canal for a minute or two, being careful that the wire is not hot enough to scar any part of the canal.

Right here is where many root-canal operations fail. The canals and tubuli must be as dry as it is possible to make them, bearing in mind that it is possible to do damage by overheating the root.

Now flood the dry root canal with the thin rosin solution, pumping it in with a wisp of cotton on a broach. When the canal is full of the solution, pass a fine wire or broach to the end of the canal. Work out all the air that may be trapped therein This is of vital importance

Select a gutta-percha cone that will reach to or near the end of the canal, holding the cone with a fine foil carrier, and pass the cone carefully and surely about half way into the canal, pumping the cone up and down in the canal usually from forty to sixty times, and, as it dissolves in the chloroform, advancing the cone farther toward the apex.

The pumping motion forces the rosin solution farther into every opening. The chloroform at the same time dissolves the periphery of the gutta-percha cone which, becoming more and more attenuated, slips farther toward the apex, surrounding itself with a mixture of gutta-percha and rosin. The rosin seals the tubuli and at the same time causes the gutta-percha to stick tight to the pulp walls, and makes the gutta-percha more stable and proof against the action of body fluids or substances.

If this does not leave the large end of the gutta-percha cone at or near the end of the canal, place a small cone alongside or on the first one; then, with cold steel plugger points that will go into the canals, gently pack the mass into the canal, using warm air to soften the protruding gutta-percha if necessary.

This packing forces the semi-fluid (chloro-percha and rosin) into unknown canals and pockets, and at the same time brings the surplus chloro-percha to the mouth of the canal, where it may be taken up with absorbent rolls or cotton.

In multi-rooted teeth complete the filling of each individual canal before starting another.

Rub the steel plugger points on paraffin cake to prevent the partially-dissolved gutta-percha from adhering to the instrument. The pulp chamber is to be filled with one of the cements.

You may ask: "Do you succeed in filling *all* canals and tubuli to the farthest extremity?" No; only those that are open and dry to the farthest extremity.

Are we likely to have inflammation in the periapical region following the closure of root canals in this manner?

The probability of inflammatory conditions in all cases depends upon the ability of the operator to read the pathological signs of each individual case and his skill and delicacy of touch in the manipulation of the various agents used.

Rosin and chloro-percha and cone is superior to chloro-percha in three ways. *First*, the rosin in chloroform penetrates deeply into the tubuli and foramina that chloro-percha will not enter at all, leaving within such tubuli or foramina, upon the disappearance of the chloroform, a more or less solid, inert, insoluble substance that enmeshes the contents and seals the lumina of such tubuli or foramina. *Second,* the rosin and chloroform causes the gutta-percha, in whatever form it may be applied, to adhere closely to the walls of root canal or cavity. *Third,* the incorporation of the rosin in the freshly made chloro-percha makes an unshrinkable and impervious mass about the gutta-percha cone. If gutta-percha and rosin be dissolved in chloroform and left in an open dish or tube to dry or solidify, the rosin will rise to the surface and harden in a crust over the gutta-percha. When the mixture is made in the root canal, as has been suggested, the rosin in solution is held firmly in place in the dissolved gutta-percha between the canal wall and the cone in the center.

We must be prepared to meet all sorts of morbid anatomical changes in the pulp chambers, root canals and the dentinal tubuli, due largely to constructive irritations long present in and about the tooth.

The slides that I shall show on the screen are selected, each one, to assist in demonstrating that the teeth which require root-canal treatment are, as a rule, far from being the perfect anatomical specimens that we see illustrated in our text-books. A tooth that has lost its pulp has usually been subjected for a long time to those conditions that bring about destructive as well as constructive changes.

The rosin solution does not show in X-ray pictures until mixed with gutta-percha, when it shows very plainly in the canals and foramina, but not in the tubuli. Chloro-percha will not enter the tubules; bismuth oxide does not dissolve in chloroform, and therefore does not enter the tubuli; the blue stain spoken of enters the tubuli with the chloroform and rosin solution, but does not show in X-ray pictures; so, in order that we might have some visible evidence of the diffusibility of the rosin solution through the dentin, I have resorted to color photography. To vouch for the correctness of the pictures, I have the original specimens here for comparison. One better versed than I in laboratory technic could certainly work out a more satisfactory scheme than this.

The pulp canals of a number of extracted teeth were opened mechanically—that is, with burs and drills—dehydrated and pumped full of the rosin and chloroform that had been stained blue. Then the gutta-percha cones were used as has been described above.

I do not claim that this procedure gives an exact reproduction of conditions in a tooth canal while the tooth is yet in service in the mouth. I do claim that the specimens and the pictures give a clear and understandable *basis* from which we can work toward a reasonable ideal.

These slides are shown more to explain the theory than to prove results. There is a vast difference between filling a root canal in an extracted tooth and one in situ.

THE CENTRIFUGAL METHOD OF CASTING ALUMINUM

BY GEORGE H. WILSON, D.D.S., CLEVELAND, OHIO.

THERE ARE TWO METHODS of constructing a metal base plate: swaging over a die and by casting in a mold. Each method has its advantages and disadvantages. The advantages of a swaged plate are that the physical properties of the base plate—hardness, strength and elasticity—are much superior in the swaged plate to the cast one. The swaged plate is made from sheet metal, which is produced by passing the cast metal through powerful rolls, thereby elongating the crystals into fibers and increasing its density. The disadvantages of swaged aluminum are, it cannot be as readily adapted as by casting, and, not being amenable to soldering methods it cannot be suitably re-enforced. The advantages of the casting methods are: a closer adaptation is possible than by swaging. and the bulk of the metal may be placed at will to meet stress; also, any form of attachments or contours may be produced. The disadvantages are that cast aluminum is very crystalline, flexible, inelastic and occludes gases. It expands excessively by heat—only surpassed by zinc and lead—therefore is contra-indicated in high vaults accompanied by thin tense membranes; however, flat to moderately high vaults favorably covered with soft tissue may be well fitted with either a swaged or cast aluminum base. Aluminum is the most electropositive metal used in the mouth by the dentist, therefore, it is contra-indicated for partial dentures if it comes in contact with metal fillings. The aluminum would be subject to disintegration by electrochemical action. It has not sufficient rigidity, without excessive bulk, to withstand the stress to which partial dentures are subjected.

Centrifugal force was probably first used for casting aluminum in 1907. Early in 1908 Dr. D. D. Campbell, of Kansas City, Mo., described the "cowbell" method in the *Dental Brief* and Dr. J. H. Billmeyer, of Norwalk, Ohio, described the "bucket" method in the DENTAL SUMMARY.

The essentially new feature in the Billmeyer method is having the feed sprue enter the mold at the lowest point and vent sprues placed at the highest point of the mold, thereby excluding confined air and causing the excess metal to aid in condensing the metal of the mold.

TECHNIC

The technic of making a pure aluminum casting, based upon the Billmeyer method, consists of a properly taken plaster impression, investment compound cast, wax model, flasking, heating, melting of metal, casting and finishing. Impression taking need not be described.

INVESTMENT COMPOUND CAST

The impression is coated with shellac varnish and glossed with sandarac varnish. It is filled with any good non-shrinking investment compound. An excellent material consists of silica sand (white lake sand), wash or float silica, and plaster of Paris, equal parts by measure. Silica is the highest fusing, the least expanding and contracting, and the best conductor of heat of any material at command. This silica sand is coarse and forms centers toward which the shrinkage of the bond material may draw, thus preventing warpage and cracking of the mass of material. The fine silica fills the pores, and the plaster serves only as a bond; therefore the strength of the compound will depend upon the quality of the bond. The ingredients of the compound are thoroughly mixed by passing five times through a sieve.

It will require three and one-half to four parts of this compound to one part of water, by measure, to make a suitable mix for filling an impression. While filling the impression the material must be thoroughly jarred into place, thereby producing a smooth surface upon the cast.

The relief or vacuum chamber may be produced by either of two methods—(1) carving the impression, or (2) adding to the cast. If the addition method is chosen, a thin solution of a fine grain investment compound is painted onto the cast. To be assured that the added portion is thoroughly attached, the cast is well saturated with water over the portion to which the addition is to be made. A good formula for a fine-grained investment compound is two or three parts by measure of wash silica and one part of plaster, thoroughly mixed by sieving.

WAX MODEL BASE-PLATE

The object sought in forming the wax model for a cast aluminum base-plate is to so place the material that the finished product shall have at every part sufficient body to resist the stress to be placed upon it; to form square joints, thus no feathery edge of either vulcanite or metal; and to provide for securely attaching the teeth by means of vulcanite to the base-plate.

TECHNIC

A sheet of pink base-plate wax is warmed and evenly adjusted to the cast, the excess is cut away with a warmed wax knife and the edges luted to the cast. It is evident that the thickness of the sheet of base-plate wax will control the thickness of the casting, therefore a wax of suitable thickness to produce the desired result must be used. The additions to the wax base-plate are made by the use of rolls of pure yellow beeswax. These rolls are made by cutting a strip of impression wax one-fourth of an inch wide, warming it in the flame, and working it with the fingers until it is evenly soft and in the form of a roll. It is placed upon a clean flat surface (top of the work bench is excellent), and rolled under pressure with another flat surface (a slab of glass ¼ by 3 by 6 inches is desirable). This first strip of wax should be reduced by rolling to ⅛ of an inch in diameter. The roll is warmed slightly and conformed by the fingers to the buccal and labial borders of the wax base-plate; the roll is continued to outline the lingual portion of the alveolar process. Necessarily judgment must be exercised in placing the roll of wax so that its substance will give the desired contour to the model base-plate. Fig. 1 shows the pink base-plate wax adjusted and the peripheral wax as adjusted by the fingers. The roll of wax is contoured and united to the base-plate by using a hot ironing spatula. The wax roll is so carved that it presents a square ledge against which the vulcanite attachment will rest in the finished denture. The next step in forming wax model is to make provision for securely holding the vulcanite attachment to the metal casting. This is best done by means of a row of cleats as near the edge of vulcanite and casting as it is possible to place them. These cleats are formed of wax rolled to a diameter of one-sixteenth of an inch, or less, and bent into a series of loops. This looped roll is placed upon the model base-plate and the points of contact luted by a touch of a hot wax spatula. When the wax is cold the tops of the loops are cut away with a pair of small curved scissors. Fig. 2 illustrates the wax model and cleats.

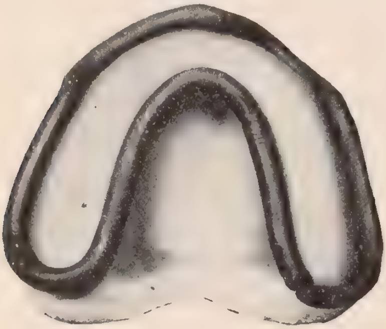

Fig. 1

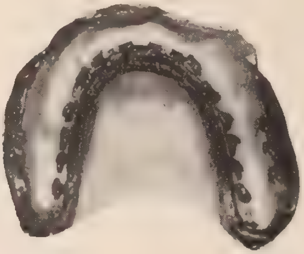

Fig. 2

The completed wax model plate is prepared for flasking by attaching gate or sprue formers. There are two vent sprues and one feed or pouring sprue. The feed sprue former is a roll of yellow wax, which must not exceed three-sixteenths of an inch in diameter, attached near the lowest part of the wax model as it is to stand in the flask. It is obvious that the larger the feed sprue hole the more quickly the mold may be filled with the molten metal; and the smaller the sprue hole the more danger of an incomplete casting from the metal chilling. However, as the feed sprue hole connects with the bottom of the melting crucible, there is a limit to its size. This limit of safety has been found by practice to be three-sixteenths of an inch. A sprue of one-quarter inch diameter is liable to permit the first molten metal to fall into and clog the lower end of the hole, thereby preventing the filling of the mold. The explanation of this fact is that the specific gravity of the metal resting over a quarter-inch diameter hole is greater than the cohesion of the molten metal. The vent sprue formers are 14 or 16 B. and S. gauge iron wire attached to the highest points of the wax models. Fig 3 shows the sprues properly attached to the upper wax model base-plate. Fig. 4 shows the Billmeyer casting bucket or flask of sheet iron, with the handle attached.

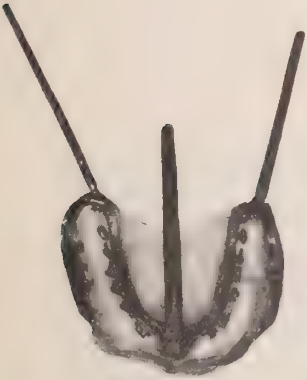

Fig. 3

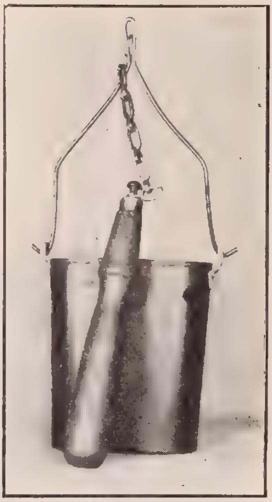

Fig. 4

FLASKING

There are two steps to the flasking procedure—(1) investing the wax model base-plate, and (2) flasking the invested case.

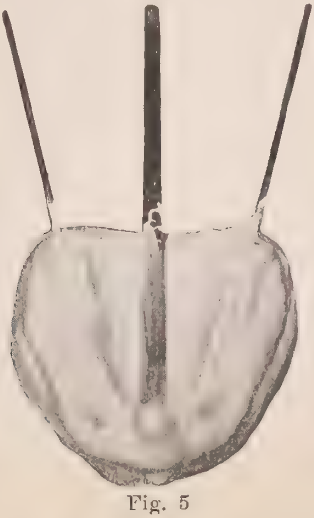

Fig. 5

The wax model base-plate securely luted to the cast is covered with water while making a thin batter of investment compound, using the same material of which the cast was made. The cast and model are removed from its bath and excess moisture quickly absorbed with a napkin. The investment batter is applied to the wax model with a quarter-inch ox-hair paint brush. Fig. 5 shows the case invested. If the investment compound is made of slow-setting plaster, the invested piece should stand about ten minutes, but if the investment is quick setting, the second step may proceed. This will require a plaster bowl full of the investment compound of a little stiffer consistency than that applied with a brush. The material is all placed in the flask, and the invested case pressed well down toward the bottom of the flask, at the same time rapping the flask on the bench to assure the perfect adaptation of the second investment. When the investment is partially set a cavity is carved about the wax casting sprue former for the melting crucible. This is shown in Fig. 6. When the investment compound has thoroughly set the inside of the crucible mold is scraped smooth with a round-end vulcanite scraper. This will leave the wax sprue former just flush with the floor of the crucible. All particles of loose compound must be brushed or jarred out. The flasked case is placed in a warm place (not in an open flame) to dry and soften the wax; as soon as the wax begins to run, the vent sprue wires are drawn and the case inverted upon the gas stove (Fig. 7). As the wax of the model melts, it either ignites or drops upon the bench. There should be no smudge of burning wax if it is in direct contact with the flame, as the carbon, hydrogen, and oxygen are so proportioned in wax that it burns smokeless under favorable conditions. For the first ten or fifteen minutes the gas is turned on about one-half, and then for the rest of the heating up it is on full. The flask should be heated in the inverted position for one hour or until there is no flame issuing from the feed sprue hole, thus signifying that the wax is completely burned. The flask is reversed, that is, the small end is down for half an hour. Heating for another half hour will do no harm, but it is unnecessary.

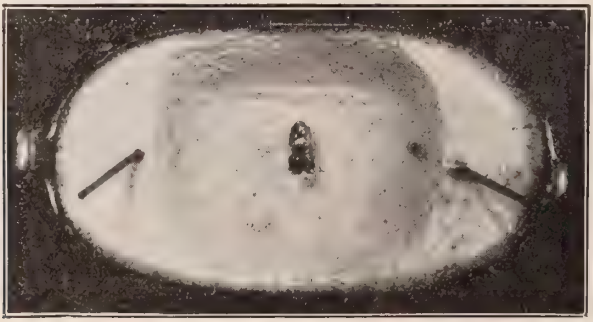

Fig. 6

The No. 1 aluminum is purchased in bars described as small notched bars (s. n. b.) containing about one and one-half pounds of metal, notched into six sections. Each section may be cut into three pieces of about equal size. One of these small pieces will suffice for any ordinary casting. The metal is very tough, therefore hard to cut. The author cuts it upon the swaging block with a cold chisel and heavy swaging hammer. The cutting is no light task.

CAUTION

Aluminum is considered a connecting link between the noble and base metals, nevertheless it is base and has the property of absorbing its oxides, also, markedly, the property of occluding gases. This latter property is evidenced by the odor of garlic (carbon compound) often noticeable in a newly made casting, also the lack of uniform density shown by burnishing a buffed surface of the metal. This implies that aluminum that has once been melted in a dental laboratory should be discarded. Upon the second or third melting of the metal a yellowish tinge may be noticed, which indicates superficial oxidation. Should the color appear with the first melting of the metal, it would indicate that the metal has been overheated, and that the casting, to that extent, is defective.

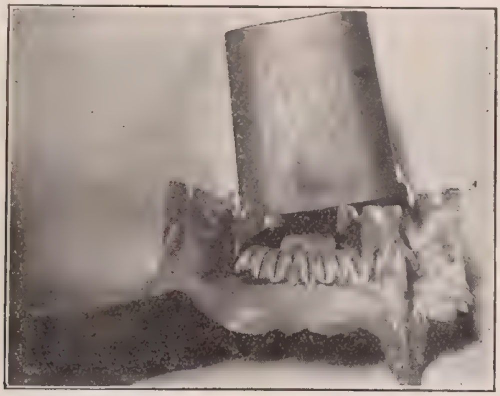
Fig. 7

MELTING THE METAL AND CASTING

Before placing the metal in the melting mold or crucible, the upper portion of the flask, including the crucible, is thoroughly heated with a large blue flame of the blowpipe. This precaution is to assure that the upper end of the casting mold is sufficiently heated, thus avoiding the granulated effect sometimes seen in this portion of the casting. The metal is placed in the melting mold and a yellowish tinged flame of the blow-pipe played upon it until it is thoroughly melted, as indicated by the nugget of metal settling upon the floor of the crucible, although the upper surface is spheroidal. The metal has the property of holding heat, so there is no need for undue haste, but no time should be wasted in getting the metal cast. The gas is turned off the gas stove, the bail is attached to the bucket, and as it is lifted from the stove the chain is made straight. The swinging of the bucket is started with a steady long swing, avoiding a jerk at the start of the swing. The diameter of the swing is quickly reduced to the limit and the speed increased. The motion should be continued until the metal has crystallized. This will probably require from fifty to one hundred revolutions.

PHILOSOPHY OF THE CASTING PROCESS

By the swinging motion centrifugal force drives the molten metal down the feed gate into the mold. By the law of physics (that liquids seek their level) the molten metal will rise in the mold and vent holes until it is on a level with the head of metal, when the centrifugal force will condense the metal until the hardness of the crystals of metal and centrifugence are equal. This will probably be when the metal has cooled 50 degrees to 100 degrees below its fusing point. It is reasonable to suppose that the metal that has travelled the farthest from the head of metal will be the first to set, therefore, the vent sprues and the palatal border would chill, and any contraction that is taking place will be made good by the molten metal under pressure backing it up, thereby keeping the mold full and providing a perfect-fitting base-plate. The writer, by careful visual observation, has not been able to detect the defects in the castings made by this method that have been noticed in the castings made by other methods. Therefore, the writer confidently presents the foregoing method as the best yet devised for casting aluminum.

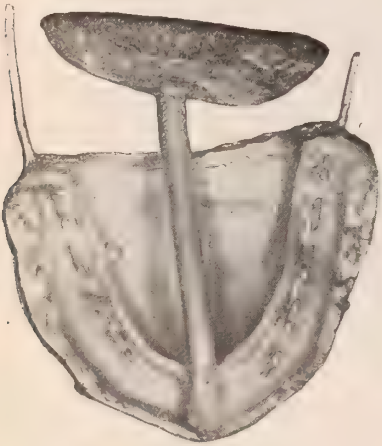

Fig. 8

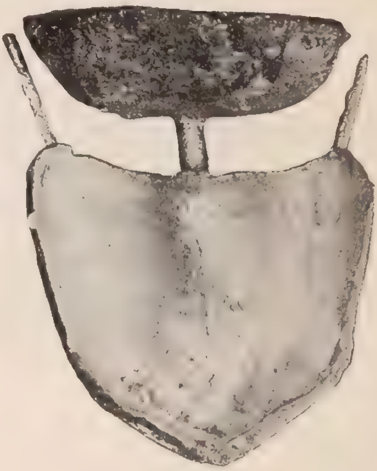

Fig. 9

SUGGESTIONS

Sufficient free space must be provided for swinging the bucket, to preclude the bucket striking and dumping the molten metal, thus endangering the person of the operator and nearby property. Such accidents are inexcusable. It is well for an inexperienced person to practice with a small bucket filled with water and describing the same radius as with the casting outfit. Confidence will soon be gained in the ability to start and stop the swing of the bucket. If a bucket full of water can be successfully handled, a crucible mold with nearly straight sides and only half full of molten metal should be harmless.

COOLING AND REMOVING THE CASTING

After swinging, the casting bucket should be permitted to stand in a cool place for fifteen minutes, after which the cooling may be expedited by submerging in cold water. A plaster spatula is passed between the flask and the investment, when by pressure upon the loose bottom of the bucket the casting and investment will be pushed out of the bucket. The investment is broken and brushed away from the casting. Figs. 8 and 9 show two castings as they came from the investment. The sprues are snipped away and the edges filed. The case is sandpapered and buffed with felt and pumice the same as vulcanite.

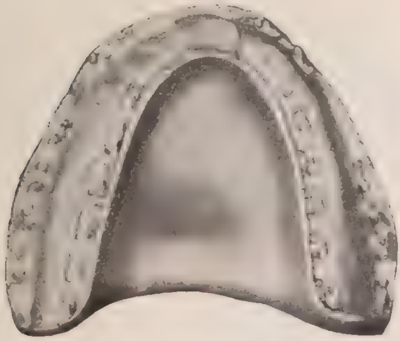

Fig. 10

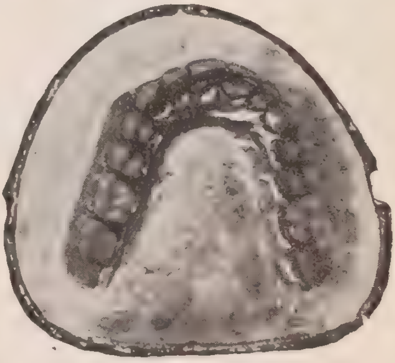

Fig. 11

CAUTION

Cast aluminum is not elastic, therefore, care must be exercised in manipulating light castings not to bend them. Probably more castings are warped by bending than by improper casting. Fig. 10 shows a trimmed and buffed aluminum base-plate.

USE OF THE ALUMINUM BASE-PLATE

The base-plate of aluminum is to be used the same as the vulcanite base-plate for obtaining the occlusion and contour wax models, mounting on the antagonizer, setting up the teeth, proving the antagonization and contour, flasking, packing, vulcanizing, and finishing.

All of these procedures are the same as for vulcanite work excepting for flasking and polishing.

FLASKING

The aluminum base-plate should be so embedded in the first half of the vulcanite flask that as little of the metal will be exposed as possible, thus avoiding the scraping of vulcanite from the buffed surface. Fig. 11 shows a case suitably encased in the lower section of the vulcanite flask.

POLISHING

Aluminum may be scraped the same as vulcanite, but it may be dressed down easier with the emery cloth bands on the lathe arbor. The lathe should be run at high speed, and light pressure used in holding the work against the abradant. Scratches are removed from the surface by the use of felt buffers and pumice, followed with a soft brush and whiting. This gives the aluminum a leaden polish due to fine particles of the metal and abradant being ground into the surface of the metal base-plate. There are three methods of cleansing and developing the luster of aluminum—(1) chemical, (2) use of special polishing preparation, and (3) burnishing. The chemical method consists of treating with caustic alkali and acids alternately. This method is hardly suitable for the dental laboratory. However, it gives a beautiful frosted effect, but it is doubtful if it is desirable.

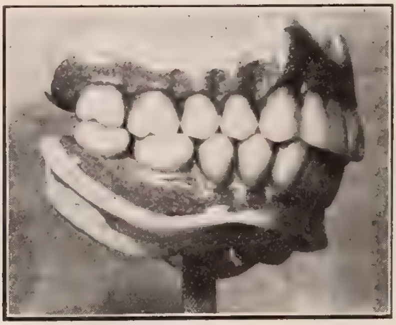

Fig. 12

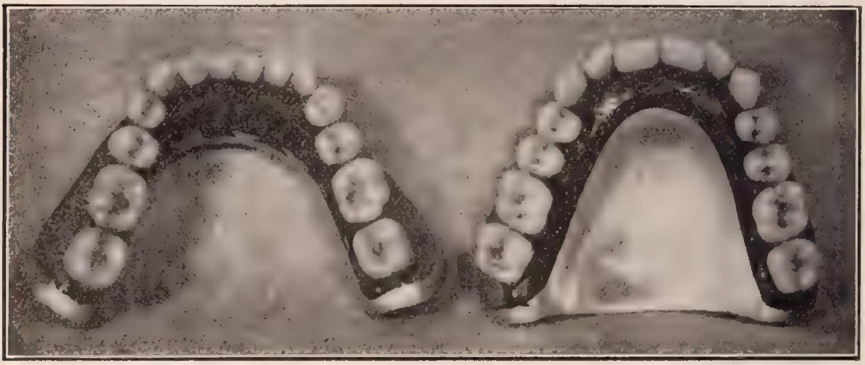

Fig. 13

There are several preparations useful for the second method. Benzine and whiting rubbed on with a buffer of cotton or chamois skin, or these materials used by hand. A paste may be made of two drams each of copper sulphate and potassium carbonate, and one ounce of lard. To this paste add a dram or two of any one of several finely ground abradants, as chalk, rotten stone, rouge, tripoli, or buckhorn.

The burnishing is done with an agate or bloodstone burnisher and a burnishing fluid composed of equal parts of olive oil and rum. This method is the very best for the maxillary and mandibular surfaces, but is open to the objection that it shows up the unequal hardness of the dressed surfaces. However, it produces the hardest and best wearing surface of any of the methods for finishing. Figs. 12 and 13 show different views of completed dentures on aluminum base-plates. Fig. 14 shows the lingual surface of a denture with the metal cast to the teeth. Figs. 15 and 16 show the same case as the casting came from the flask.

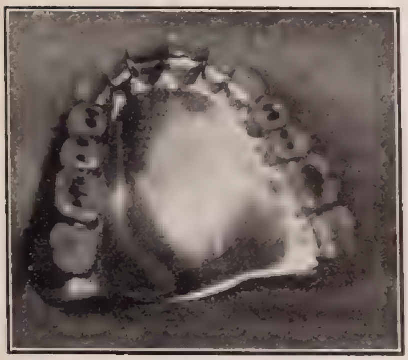

Fig. 14

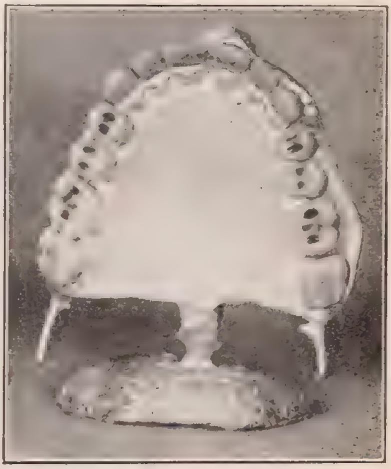

Fig. 15

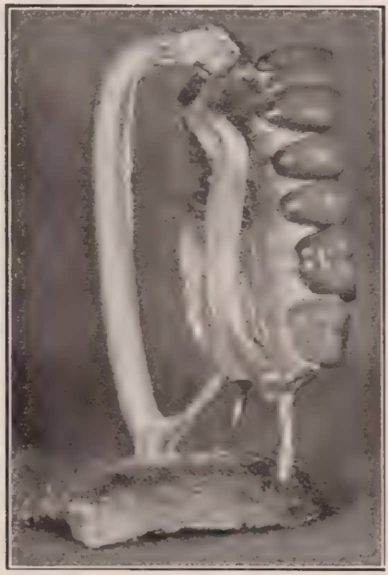

Fig. 16

CASTING TO PORCELAIN TEETH

The wax model must be so shaped that the cast metal will not overlap any edges of porcelain. The lingual surface of the denture must be carved to shape in the wax and smoothly finished. Choloroform can be used to finish the wax surface. The flasked case should be made very hot before pouring the metal; and then the case must stand until it is cold before removing from the investment. Platinum pin teeth should not be used, as the molten aluminum is a solvent for platinum. The labial and buccal surfaces are finished with vulcanite. This method (casting to teeth) is of doubtful expediency.

FROM THE BORDERLAND OF MEDICINE AND DENTISTRY

BY HERMANN PRINZ, A.M., M.D. D.D.S., ST. LOUIS, MO.
DIRECTOR OF THE RESEARCH LABORATORY, WASHINGTON UNIVERSITY DENTAL SCHOOL

(Continued from September)

DISEASES OF THE ANTRUM

The diseases of the antral sinuses as a sequence of disturbances about the teeth are of very frequent occurrence. The question whether an infection of the antrum results more frequently from diseases of the teeth or from the anatomical continuity of the disturbed lining of the nose is often seriously debated. It is but natural that the rhinologist will observe a greater number of cases that are directly connected with the disturbance of the nose while those cases that come within the province of the dentist are probably always caused by defective teeth. Judging from the observations of men who have had wide experince in this particular field we are probably safe in stating that nasal and dental troubles share about equally in the causation of antral disturbances. The question has also been frequently asked: Is a dentist, from a professional point of view, entitled to treat antral diseases or does the treatment of this sinus belong exclusively to the sphere of the rhinologist? As an answer we may be permitted to reiterate a statement as given by Blair in his recent excellent work: Surgery and Diseases of the Mouth and Jaws. "A skilled rhinologist is the only one competent to treat diseases of the upper nasal sinuses. On the other hand, if the disease is an extension from around a tooth, it is just as important that this source of infection is eliminated. In the acute or subacute stage the most logical procedure in cases infected from the tooth is to drain both the cavity and the diseased submucous tissues through the same opening, which can be done at least as well by the dentist or by the general surgeon as by the rhinologist." We are in full accord with this conception of our colleague. The roots of the first molar, the second bicuspid, the second molar, and, rarely, the last molar or first bicuspid are frequently found penetrating through the floor of the antrum and, as a consequence, diseases of the pulps of these teeth by continuity may involve the sinus. In treating the roots of these teeth or by their extraction the antrum is frequently entered into. Probably in the greatest majority of cases no subsequent disturbance will arise and, as a matter of fact, slight openings into the antrum are often passed by unnoticed. Acute infections, however, call for treatment which consists primarily in the repeated irrigation with a warm saline solution through the tooth sockets or, in rare instances, even through the root canal and these efforts are usually crowned with success. Chronic infections of the antrum are rarely benefited by irrigation. They usually call for a radical operation, which is preferably best attended to by the general surgeon or the rhinologist. In an attempt to extract a root, rarely a sound tooth, it may happen that the root will slip into the sinus through its thin diseased floor. This accident is of no serious consequence, provided that the root or the tooth is removed as soon as possible, otherwise infection is sure to follow. On one occasion the writer was called upon to remove a fully developed third molar with curved roots, which had slipped into the sinus in an attempt to extract it. In the modern procedure of antrum therapy the old-style solid plugs are rarely called for. If they are required, they should be cast of pure tin or an alloy thereof (Watts metal, etc.), from a pattern obtained in the same manner as required in the construction of a gold inlay. Permanent metallic drainage tubes are relics of the past.

During the present winter and at the same season in previous years the writer has been consulted at various times regarding more or less pronounced neuralgiform pain in upper sound teeth, which apparently was of an idiopathic nature. The electric current usually would reveal nothing but a slight hyperemia of the pulps. Careful diagnostic inquiry, however, revealed the fact that the patient usually suffered from a severe acute form of influenza. A consideration of the close anatomical relationship of the involved antrum and the pulps of the teeth within that region suggested the possibility of a toxic irritation of the pulps from the influenza, an assumption which was corroborated by the relief obtained through proper medicinal treatment. With the cessation of the grippe infection the pain in the teeth disappeared.

Chronic rhinitis is also known as having caused constant severe pain in the upper incisors and canines. A pertinent case illustrating this possibility has been recently observed by us in one of our colleagues. With relief from the chronic rhinitis, the recurring intolerable pains in the upper teeth vanished permanently. Here again we should recall the close anatomical relationship of the nerve supply of the lower part of the nose and the teeth present in the intermaxillary bone. According to Clermont, the anterior superior dental branch of the superior maxillary nerve which supplies the incisors and canines and gives off a nasal branch which supplies the mucous membrane of the anterior portion of the nasal cavity is not enclosed deeply in the substance of the maxilla, but it runs in close proximity to the floor of the nasal cavity. In many cases the canal is really only a groove. This fact readily explains the possibility of anesthetizing the upper anterior teeth by packing the anterior nares with cotton saturated with an anesthetic solution.

DRUG EXANTHEMA.

The ingestion of certain drugs, i. e., antipyrine or migraine, phenacetine or aspirine, and compounds thereof, occasionally produces a pronounced red rash over the entire mucous lining of the mouth and also on the skin. These rashes usually disappear readily after the discontinuation of the respective drug. Concentrated alcoholic solutions of essential oils and their derivatives, especially the oils of eucalyptus, wintergreen and peppermint or, respectively, eucalyptol, salicylic acid, salol, menthol and similar compounds when used as mouth washes, are occasionally productive of a scaly eczematous eruption about the external mouth, especially near the corners, known as mouthwash eczema. The prohibition of the mouthwash and substituting a saline solution as a test, together with a simple ointment to act as a protector over the scaly surface usually bring quick recovery of the otherwise obstinate eruption.

In this connection it is probably not amiss to call attention to a mistaken conception regarding the therapeutic value of potassium chlorate. Potassium chlorate as a remedy for the various forms of stomatitis is looked upon by many practitioners as a veritable panacea. As someone has said, "It is one of the most reliable remedies, indeed almost a specific in ulcerations of the mouth, particularly in stomatitis," etc. Others have lauded it as a prophylactic in mercurial stomatitis, claiming that it will prevent salivation. Potassium chlorate has been introduced into therapeutics on the erroneous theory that it will decompose in the body and supply oxygen to the tissues. It is supposed to be largely excreted by the saliva, and thereby to continuously bathe the diseased mouth with this oxygen-laden fluid. While potassium chlorate is very readily absorbed by the gastro-intestinal tract, it does not part with its oxygen at the temperature of the tissues; in fact, it is excreted almost wholly unaltered. About ninety per cent. is removed with the urine, the remainder passing out through the salivary glands. In consequence of its resistance to decomposition in the tissues, it possesses very little if any, value as an antiseptic, and its therapeutic effect depends probably wholly on its "salt" action. This fact decides its worthlessness as a prophylactic in mercurial stomatitis. In the mouth it acts as a ready solvent for accumulated mucus, and imparts to the mucous surfaces a cool saline taste. On the other hand, it should be remembered that potassium chlorate acts as a dangerous poison. When absorbed by the blood the greater part of the hemoglobin is either directly destroyed or changed to methemoglobin, and the typical picture of chlorate poisoning is, consequently, always accompanied by pronounced cyanosis. "Increased experience has also taught us that next to the potassium cyanid, it is one of the most poisonous of the potash salts which are used in medicine.'' The absorption of potassium chlorate from the gastro-intestinal canal occurs occasionally most rapidly. Sollman reports a case in which death occurred within two and one-half hours after the chlorate had been taken. While the lethal dose of potassium chlorate varies very much, fifteen grains has been fatal in a child. In a case recently reported, a girl of seventeen had swallowd, during gargling, a more or less large portion of a potassium chlorate solution; within a week's time she died of typical chlorate poisoning. Quite a number of similar cases may be readily cited from the literature. Potassium chlorate in tablet form for throat trouble is in common usage by the laity; such practice should be condemned. Some years ago, Unna advocated the use of a tooth-paste containing fifty per cent. of potassium chlorate for the treatment of mercurial stomatitis. Since then this paste has been widely advertised in the United States and Europe as being a veritable panacea in all forms of mouth diseases, including, of course, the *béte noire* of all oral disturbances, pyorrhea alveolaris. Lured by the attractive advertisements, some dentists have made it a practice to prescribe this paste to their clientele for daily use. Aside from the disagreeable salty taste, the continued use of this paste is prone to produce inflammed and bleeding gum margins, which, however, usually promptly disappear on discontinuing the paste and substituting a warm one-per cent. sodium chlorid solution. The late Miller stated that potassium chlorate inhibits the growth of oral bacteria in a solution of one to eight parts, but that the strength of this solution in which it can be used with safety in the mouth should not exceed one to forty parts. Relatively speaking, potassium chlorate is about forty times less active on oral bacteria than borax. According to a recent investigation by Traube, it has been shown that the increase of the quantity of potassium chlorate and similar salts in their toxic effects upon bacteria does not represent a straight line but a parabolic curve and, as a consequence, weak solutions, i. e., about five per cent. are almost equally as effective as are stronger solutions. The empirically accredited therapeutic value of potassium chlorate is a typical example of drug idolatry. We have discussed this question somewhat at length but by no means exhaustively, because we have been recently accused of being prejudiced against this drug.

While referring to mouth washes, the following incident may be of interest to the reader. A dentist had prescribed a solution of milk of magnesia as a mouth wash. A few days later the patient reported that the otherwise milky-looking mouth wash when ejected from the mouth always had a peculiar pink tint. We received a sample of this used mouth wash and found that it contained traces of phenolphthalein. We informed the dentist that he should advise his patient not to worry about this discoloration as the pink tint was due (as we supposed by inference) to the use of ''Purgen'' tablets which the patient took as a laxative. Our supposition was verified by the patient. Purgen, Prunoids, and various other compounds of this nature contain variable quantities of phenolphthalein, which, aside from its laxative effect, is used in the laboratory as an indicator for alkalies, producing a pink color. In chewing these tablets small quantities of this compound were retained about the teeth, hence the pink reaction with the milk of magnesia. A similar observation has been related to the writer by Dr. E. C. Kirk.

Powdered vegetable charcoal, which is often found in the so-called Japanese and Chinese tooth powders, presents a mass of sharp, crystalline cylinders when viewed under the microscope, which possess marked abrasive power. When used as a component in a tooth powder, the sharp particles imbed themselves in due time into the gum tissues producing a distinct bluish line near the gum margin which may simulate the lead line. The gum tissue becomes tattooed by the charcoal and nothing can remove these pigmentations but a surgical operation.

METAL INTOXICATIONS.

The inhibition of metal poisoning in the oral cavity is of common occurrence. Metal intoxications may result from medicinal administration, from occupation, or from ingesting poisonous chemicals with suicidal intent. Metals in their pure state usually do not induce any serious symptoms in the living human organisms, unless their salts or oxides are formed. Soluble and insoluble salts of gold, nickel and tin are probably not absorbed by the intestines even if they are administered continuously for months; hence vessels that are made from such metals, or that are covered with a continuous coating thereof, and that are used for culinary purposes are free from danger, if kept clean. Silver salts, if administered for a prolonged period, may be absorbed and deposited in a reduced form in the connective tissue causing a gray discoloration of the skin (argyria). Lead, bismuth, and mercury salts are readily absorbed and, consequently, when administered in continuous doses, produce typical chronic intoxication—lead colic, bismuth stomatitis and mercurialism. Certain metals, as mercury, bismuth, iron, etc., are readily excreted by the lower bowels, while some metals, as mercury and bismuth, show a predilection for the diseased mucous membranes.

Mercurial stomatitis, as a sequence of prolonged administration of the various forms of mercury for medicinal purposes or as a trade disease is at present far more rarely observed than in bygone days. The co-ordination of three essential factors is necessary for the full development of this disease, i. e., the Hg-intoxication, local disturbances, and bacteria. That the Hg-intoxication is not the sole agent in the causation in this disease is borne out by the fact that mild mercuric bichloride solutions have been successfully employed in the treatment of mercurial stomatitis. A portion of the absorbed mercury is excreted with the saliva and its continuous contact with the epithelium of the mouth lowers the resistance of the mucous linings and invites bacterial invasion. Decubital ulcerations of the gum tissues follow, the tongue becomes swollen and thickly coated and the breath assumes a foul odor, accompanied by a disagreeable metallic taste. The local disturbances are observed only in the presence of pathological foci, i. e., accumulations of calcareous deposits, carious or percementitic teeth and pockets about normal and especially partially erupted teeth. If the dose of Hg is within normal limits, mercurial stomatitis is a preventable disease. This dogmatic statement is substantiated by the absence of mercurial stomatitis in the mouths of babies, and in the edentulous mouths of the aged. If prior to and during the Hg-administration extreme hygienic care of the oral cavity is rigidly insisted upon usually no manifestations of the disease are to be observed. These facts are borne out by experimental studies of Lanz, Ritter and others. The supreme prophylactic procedures consist in the vigorous use of the tooth brush, not merely restricted to the tooth surfaces but also employed as a massaging agent over the entire oral mucosa, in conjunction with an alkaline peroxide solution, i. e., a two-per cent. solution of sodium perborate or a hydrogen peroxide solution rendered alkaline by the addition of small quantities of borax.

General bismuth poisoning manifests itself in the mouth very much in the same manner as mercurial intoxication. A bluish-black discoloration of the gingivae followed by gangrene of the gum papillae and accompanied by an extreme foul odor and a metallic taste are the usual symptoms. The fatal absorption of the drug from dusting powders, from mixtures used in X-ray work and from the Beck bismuth paste, which in the last few years has been widely used in the treatment of chronic fistulas, bone abscesses, and in pyorrhea alveolaris, is a well established fact. While comparatively large quantities of bismuth have to be absorbed to induce serious symptoms, nevertheless, even the comparatively small quantities present in Beck' s paste as employed in the treatment of pyorrhea alveolaris are known to have produced typical toxic symptoms in the mouth. From a clinical point of view, Horsley's bone wax, or, still better, the Mosetig bone plombe, offer decided advantages over the bismuth paste without possessing any of its drawbacks. The mechanical obliteration of the fistula or the pocket with a sterile absorbable plug seems to be the predominating factor in the rationale of this treatment.

Acute lead intoxication is rarely met with, while the chronic form is most frequently observed as a trade disease, i. e., in smelters, painters, workers in white lead factories, dye workers using sugar of lead, etc. Its characteristic evidence in the mouth, which by no means, however, is essential for the diagnosis of the disease, is the lead line and a diffuse stomatitis with a foul odor from the breath. The bluish-black line is principally restricted to the gum margin about and between the teeth and cannot well be confused with some other disturbances, except the charcoal line. In a recent work by Legge and Goadby on "Lead Poisoning and Lead Absorption," the formation of this line is described as follows: "It is undoubtedly due to the decomposition of the lead salts which have gained access to the mouth, by the sulphuretted hydrogen produced by the decomposition and putrefaction of food, epithelial debris, and other materials, which have accumulated around the edges of the teeth and in the interdental spaces. Peculiar evidence of this may often be seen in the mouths of certain persons whose parotid glands are discharging saliva which promotes deposits of calculus. Thus, one may often find merely the two first upper molar teeth on both sides of the upper jaw coated with tartar, no other teeth in the upper jaw being similarly affected. This deposit of calcium phosphate and carbonate is exceedingly porous, and becomes saturated with the products of decomposition evolving sulphuretted hydrogen in fairly large quantities. In the mouths of such persons working in lead factories a dark bluish staining of the cheek in apposition to the filthy tooth may be frequently seen, and where the rest of the teeth are free from deposit no such staining is observable. Viewed with a hand-lens, the blue line is seen to be made up of a large number of minute granules of dark color which are deposited, often deeply, in the tissue. It is a matter of importance to note that a blue line is rarely seen in the mouths of those persons who pay attention to dental hygiene: where the teeth are clean, the gums closely adherent to the teeth, and entire absence of pus and freedom from deposit we have never seen a Burtonian line produced. Many of the so-called healthy mouths with perfect teeth have infected gums. In the second variety of blue line the pigmentation is not confined to the gum edge or to a band rarely exceeding a millimetre in width, as is the ordinary common blue line. In this case the whole of the gingival mucous membrane from the edges of the teeth, and extending some way into the buccal sulcus, five or six millimetres or even a centimetre wide, may be seen. When this phenomenon is present, it is always associated with a marked degree of pyorrhea alveolaris, the gums are soft, edematous, and pus oozes from their edges; the teeth are frequently loose, and the other symptoms of disease of the *os marginum* are present.'' Here again we may repeat what we have said about mercurial stomatitis, i. e., rigid hygiene of the teeth and gum tissues will reduce the manifestations of lead intoxications in the mouth to a minimum.

A most interesting case of deposition of copper in the bones and teeth is recorded by Kobert. He received some bones and teeth which were obtained from authentic burial places of the early Greeks near Athens and which showed marked greenish discolorations. An analysis showed these deposits to be copper. The copper was present within the structure of the bones and teeth and not merely as an external deposit. The presence of copper in this connection can be explained only upon the basis that during the life time of the individual continuous small quantities of copper were taken with the food. Such small quantities (up to 1-32 of a grain per day) taken with the food do not necessarily produce symptoms of disease. This is equally true of silver, when taken for medicinal purposes. The presence of the copper in these teeth and bones may be traced to the utensils made of copper or an alloy (bronze) thereof as used in preparing and storing of the food in the early days of Greek domestic life. Very recently large quantities of collodal copper, i. e., as much as 800 c. c. are injected in more or less continued doses in the treatment of cancer. So far no untoward effects have been observed.

(To be continued)

ESSENTIAL CONSIDERATIONS REGARDING THE TEETH AND FACE INVOLVED IN THE STUDY OF ORTHODONTIA.*

BY L. G. SINGLETON, D.D.S., PITTSBURG, PA.

OBSERVATIONS MADE at too close range may result in just as much distortion as long-distance views without the proper focal adjustment. Objects close at hand may appear far out of reach when viewed through the large end of a telescope; while those points at great distances are brought plainly within the range of vision by a proper focusing of the lenses. Let us take a long-distance view of these, our faithful friends, and avoid that contempt which comes of too great familiarity.

The forces of Nature have been uninterruptedly concerned in the problems of teeth for untold millions of years. Prolific in the creation of designs effective in the purpose for which they have been evolved, she has traversed widely the range of possibilities in arriving at the human dentition. And the value of each unit in the stages of evolution is not less important than the highly specialized organs which are the heritage of man, the existence of the latter being solely dependent upon the successful termination of processes in the former.

A full consideration of teeth would lead us into the paleontological records of the past geological periods. The development of knowledge concerning the different forms of life upon the earth has been inseparably associated with the study of the characteristics of the teeth. The value of tooth forms in unraveling much of the mystery of the ages cannot be overestimated. The history of the past is indelibly marked by epochs in the evolution of the teeth. These dermal appendages, owing to the nature of their composition, have persisted as one of the most substantial evidences of pre-existing species, and have served as the most certain mark of identification in the classification of genera, which fact might discredit the notion that teeth lack qualities to withstand the vicissitudes of a single generation.

Different types of teeth bear such a particular relation to the various specimens in the animal kingdom that the genera is readily determined in a manner satisfactory to the requirements of science. In fact, some prehistoric mammals are known only through remains of teeth and jaws. The fishes, from the earliest times, reptiles and mammals have all had teeth;

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*Read before the Cincinnati Dental Society.

and even birds are not without their dental experience. And while teeth are not now an incident in the continuation of that species, the statement has been freely made that the dentition of man is in a transitional stage, liable to terminate in a condition parallel with the proverbial fowl.

The evolution of tooth forms has been traced from the simple cone of the fishes, through the cone with two lateral accessory cones, passing to the triangular crown with three main cusps, on up the line to the tritubercular and quadritubercular teeth of primates, including man.

As long as man has existed as a separate species in the zoological kingdom, which comprises a period of untold thousands of years, his typical dentition has been retained as a most persistent and dominant characteristic. During the long ages of the past, and with conditions conceivably quite as favorable as at the present time, for the inauguration of changes in tooth forms and position, the teeth and jaws of man have retained their typical characteristics.

Having this thought in mind, we should be able to fortify ourselves against the notion that occasional aberrant forms, discrepancies in number and departures from the normal in position, are in any distinct manner an evidence of a sudden enactment of the laws of evolution to the human dentition. It takes millions of years to evolve a tooth form.

However, we are what we are as the result of the processes of evolution; which appear, in the case of man (at least insofar as the individual is concerned), to have reached a condition of organic stability. And, on the average, in the phylogeny of the species the individual units continue to reproduce the characters of their kind.

Along with other characteristics impressed upon the germ plasm for each individual are the potentialities for the development of fifty-two (52) teeth in typical arrangement. And it is a fact of marvelous significance, that as early as the seventh week of foetal life the processes for their promulgation have already been inaugurated. It is a thought worthy of grave meditation that these organs, which through disuse, ignorance or neglect so often fall into decay, have their incipiency almost simultaneously with the conception of life itself. It must argue with telling effect against any thought as to their insignificance in the economy of the organism—as unessential appurtenances, to be eradicated at will, or left to destruction by default.

The teeth are an expression of our ancestral inheritance. For the fullest realization of this inheritance we are dependent upon many and varied external developmental stimuli. Without appropriate environmental conditions during the formative period the inheritance may fail to realize itself in development.

Thus for our present purpose, as we are concerned in the effects of aberrations in development, we may dispose of the causes of irregularities of the teeth (including impactions as well), which are, in form and position, at variance with the type of the species, as due to the absence of appropriate environmental conditions and developmental stimuli. The function, therefore, of the orthodontist, and likewise the aims of the idealist, is not merely tooth alignment or the construction of ingenious appliances; not the reversal or obstruction of Nature's processes; not the creation or mutilation of types, but the endeavor to realize the purest expression of the inheritance in the individual.

The only scientific basis for the attainment of this goal is in the application of the principles of normal occlusion, as advocated by Dr. Angle, more especially since this standard enjoys the distinction of having been universally incorporated as a part of the architectural design in the creation of species.

Of supreme importance for a full understanding of normal occlusion is a clear conception of the "line of occlusion," which Dr. Angle has defined "as being the line with which, in form and position according to type, the teeth must be in harmony if in normal occlusion."

Again, "It may be regarded as the basic ideal of the dental apparatus, the comprehension and appreciation of which will grow in proportion as our knowledge of the science of occlusion unfolds."

(Further quotation from "Malocclusion of the Teeth," 7th edition, Angle.):

> "There can be but one true line of occlusion, and it must be the same as the architectural line on which the dental apparatus was constructed. This ideal line was intended to govern not only the length, breadth and peculiar curve of the dental arches, but the size and pattern of each tooth, cusp and inclined plane composing these arches. And more than this: that as the dental apparatus is only a part of the great structure—the human body—each part and each organ of which was fashioned according to lines of design, it must have been intended that the line of occlusion should be in harmony in form and position with, and in proper relation to, all other parts of the great structure, according to the inherited type of the individual."

The value of much that has been written regarding the relations of the teeth might readily be determined by the measure of their conformity to this ideal conception of the "line of occlusion." Mere contact of surfaces and close approximation of the units in alignment, regardless of their number or denomination, does not satisfy the requirements of the science of occlusion. The sizes and shapes of the teeth themselves, which are a distinct part of the inheritance, together with their growth force, and these, co-ordinating with the physiological stimulation of appropriate environmental conditions, determines the size, form and position of the dental arches in conformity with the type of the individual.

The value of a discussion of underlying principles, and the real spirit of orthodontia in a strictly dental meeting, might be justly questioned were it not for the practitioner's contributory responsibility for much of the harmony and some of the disharmonies in the human face. And the failure to institute measures of prevention for errors of dentition involves not less responsibility in the ultimate result than a mild indifference as to the supreme necessity for the proper relations of the teeth.

Statements that the results of the application of the principles of normal occlusion in orthodontic procedure do not justify the claims of its advocate are an evidence of a misconception of the real spirit of orthodontia. Dr. Angle has defined orthodontia as "the science which assists Nature in building the line of occlusion." Orthodontists are not in accord with the idea that the dentition may be permitted to pursue a vicarious course of development until the teeth have reached an uncertain position of latitude and longitude, then expect, by the institution of some form of mechanical violence, to eradicate all the evidences of perverted growth and obtain a result comparable with the perfect correlation of parts in unrestricted metabolism.

The shapes of crowns of teeth, as well as their roots, are a continuation of characteristics which are a part of the heritage of the species, and are generated in conformity with the laws of heredity.

The course of development pursues characteristic pathways, but its full realization is susceptible of interruption and perversion. However, either in its perfection or its deviation, it comes fully within the bounds of natural laws.

And herein lies the value of orthodontic procedure. Not that we shall stand idly by, countenancing perverted efforts of growth, expecting later on to step in and induce Nature to reverse her course. Her persistent refusal is an evidence of the astounding folly of such an attitude.

Rather should we fortify ourselves by familiarity with the architectural design, anticipate its requirements, and superintend the construction as indicated, in conformity with natural laws. Then only shall the structure be in full accord with the design. Then asymmetry shall give place to symmetry, and harmony and balance shall rule supreme.

The lay conception of the value of teeth, although showing some evidences of improvement, is rather disconcerting. To many they are abominable encumberances that must be tolerated, because they have been inadvertently thrust upon them, and that a full measure of happiness cannot be experienced until they have been exfoliated. To others an aversion arises from the fact that they do not possess self-contained invigorators for automatic repair, and that they will not tolerate conditions of neglect a hundred fold greater than any other tissue or organ of the body. The insignificant item of occlusion is incomprehensible; every requirement in this direction is fulfilled, if only they "hit."

In the matter of alignment, if they form an ellipse, they are "straight." If the teeth are crowded, they have their father's teeth, in their mother's jaws, which necessitates either "pulling" the teeth or "stretching" the jaws. And to esthetic considerations, they have a vague conception that their cheeks will "fall in" if they lose their "side teeth" before entering the matrimonial state, which might make them liable to "fall out" with themselves later on.

Fortunately, this attitude of the laity is not universal, and there are already symptoms of awakening, as is evidenced by the concern manifested by parents in the essential value of mastication in assimilation and nutrition, and the esthetic qualities of teeth in "making or marring the beauty and harmony of the human face."

Teeth by themselves are an uninteresting and ofttimes a repugnant section of anatomy to the average individual. The technicalities of their structure and their operation in function is likewise of minor concern. But the announcement of their relation to associated structures, and especially their involvement among the essentials of beauty, is hailed with instantaneous favor. And while the individual knows little and cares less concerning teeth, he knows much regarding faces, and he is enthusiastic regarding any essential which influences the esthetic value of a physiognomy.

Therefore, in order to obtain an audience among those who have the greatest need, it seems necessary and distinctively more effective to begin on the outside and travel in, rather than start on the inside and work our way out.

Engrossed with this attitude, we may study the relative value of teeth in the design of the face by a consideration of certain elements which are involved in the delineation thereof.

According to Socrates, "all parts of the body are made for some thing, and this cause for which a thing is made is an action; whence it follows that the body altogether has been created by Nature with a view of an excellent action."

The human face is the embodiment of a mechanism most perfect for the purpose for which it has been created. The design, primarily, is the physical manifestation or measure of its conformity to this purpose, as the result of the aggregate of cell activity.

Along with the great similarity of anatomical constituents exhibited in progression from the lower forms up to the more highly specialized, and by the aid of which the paleontologist, in retrospect, is able to clearly discern the tendencies in the course of evolution, there are also marked structural differences in the same species, whereby we recognize many functional differences resulting therefrom. Certain peculiarities in individuals are often only detected through physiological action rather than by anatomical structure.

The application of these facts may be utilized in arriving at an estimate of the human face. The expressions of emotion follow characteristic pathways, and their interpretation is uniform the world over, even in the absence of spoken language. In the orders of the more intelligent there is provided a more highly specialized mechanism for this expression, as is evidenced by the clumsy organization of muscles in our Simian ancestors as compared to that of man.

There are elements in the design of the human face which establish the distinction between it and the analogous part of the lower animals.

And yet they have all the parts, with the exception perhaps of the chin, which is distinctly a human feature.

There are, likewise, points of difference in the faces of man which mark the distinction between races, as well as between individuals. As there are no two races exactly alike, in like manner no two individuals conform precisely to the same mold, and yet there are types of faces as well as types of races which mark the relationship between individuals as well as among races.

To inquire into the origin of types would be almost equivalent to an investigation of the very mystery of life itself.

Their origin is associated in some essential manner with "areas of characterization" (de Quaterfages), which "signifies that like physio-geographical conditions prevailing over a given area, inhabited for many generations by the same peoples, have impressed upon them certain traits, physical and psychical, which have become hereditary and continue indeterminately, even under changed conditions of existence."—(Daniel G. Brinton.)

It is, perhaps, safe to state that it will require as many ages of evolution to dispose of any of the main characteristics of a type as was consumed in their formation. Any intention, however, of disparaging the significance of "variations" is emphatically disclaimed. Their importance and number is fully recognized. Variation and change is one of the fundamental principles of life, but with all these variations, and in consideration of all these changes, Nature has not succeeded in, and presumably has not tried, dispensing with an eye, a nose, an ear or a tooth. And in spite of any and all bodily modifications acquired during the life of the individual, she has not succeeded in disinheriting the future offspring of the advantage or disadvantage of such modifications.

Having noted the existence of types as well as their stability, it is not within the time limits of this essay to enter further into details regarding separate features of the face, except to refer to certain distinctions measured by the facial angle or index, with which you are perfectly familiar.

An appreciation of the facial angle implies a recognition of rank in the intellectual scale, as is emphasized by the ancient Greeks in exaggerating, in their arts, the prominence of the forehead or seat of intelligence to indicate their superiority over the lower animals.

As pointed out by Dr. Angle, the teeth and jaws in any type of face bear a definite relation to the architecture of the skull. They are analogous in some such manner as is the individual to its limit of growth. Therefore, it may be assumed, as an essential consideration of the natural law of growth and development, that the teeth will take a position, not just so many paces from the ear, nor any certain number of fingers below the nose, but just exactly at the spot or spots which will be in conformity with the distinctive design for the individual, provided, of course, there is the necessary vigor, stimulation, and the absence of perverting conditions and forces.

PYORRHEA AND GRAFT

BY DR. L. WEST, MONETT, MO.

AFTER READING THE MANY ARTICLES recently published in the dental journals one cannot but conclude that either ignorance or graft is responsible for the slow, uncertain results in the treatment of pyorrhea.

Ignorance of what is best to do in a given case or the desire to graft upon the misfortunes of others, makes a long and expensive case of what would have been a simple and cheap one in the hands of an honest, efficient operator. The quickest way to cure should be the aim of every one employed to relieve people of diseases.

Cleanliness is the first requisite in beginning the treatment of pyorrhea. Cleanliness of the mouth first, and also of the system. A patient calls. You examine the mouth, and incidentally notice that the tongue is coated. Your nose tells you that mouth is filthy, that the patient's blood is saturated with filth. The breath is offensive out of all proportion to the filth in sight. Deposits of tartar and remnants of food in sight everywhere. Faugh! What will you do? What would you do for your closet if it were in such a condition? Turn on the water. Take a broom and sweep out all the filth in sight. Now apply your disinfectants and germicides. Things look cleaner. They smell cleaner and are cleaner. Just so. Now apply the same plan of getting rid of the filth in this patient, only let the patient do the cleaning up. After he has been doing this for a few days you can safely begin the instrumental treatment necessary to effect a cure. Have your druggist put up the following prescription for you and label it Pheno-Thymol:

℞ Phenol	1 part
Thymol	2 parts

(Add a few drops of alcohol to effect solution)

In beginning treatment I make the following prescription:

℞ Formaldehyde	40 per cent.
Alcohol aa	$\frac{1}{2}$ oz.
Pheno-Menthol	10 gtts.

(Mix. Sig. 5 to 10 drops in about one ounce of water in a cup or glass)

Have the patient thoroughly cleanse the mouth with a brush and warm water. Then use the above prescription as a finish for the case two or three times a day after meals. If the patient is constipated, have him take one or two teaspoonfuls of a Sat. Sol. Sod. Phosphate in one or two glasses of water on rising in the morning at least one hour before meal time. Have the patient use the above treatment for a few days before beginning other treatment. Have ready all the instruments necessary for cleaning the roots of the teeth. If the alveoli around any of the teeth has been absorbed and the teeth are very loose determine the advisability of trying to save them by banding them to the other teeth or extracting them. There is no use in wasting time trying to save teeth that will not remain comfortable and serviceable after they are cured. Clean off all the tartar in sight. If the gums bleed and make it difficult to see what you are trying to do, work on some of the other teeth. One hour is long enough to work on a patient at one sitting. After a few days another sitting may be had. Have the patient continue to use the above prescriptions as before. As the inflammation subsides you can see where the small particles of deposit are and you can remove them easier. Don't try to remove every particle of deposit at the first sitting—you can't do it in every case if you try. After instrumentation, flush out all pockets with the formaldehyde prescription, using a glass syringe with platinum point. Other preparations may be used to flush out the pockets, but I have found the one given here to be all that is necessary. Get the roots of the teeth clean and smooth and it does not matter much what you use to inject the pockets with. See your patient once a week for three or four weeks. Be certain that all deposits are removed and then the visits may be extended to one or two months, but never lose sight of the case until you know that it is cured.

If you wish to cure your patients, use the above plan of treatment and you will succeed beyond your expectations. But if you wish to graft, get a lot of atomizers and compressed air apparatus and make all the display you think necessary to impress your patient with the idea that you are taking all the pains possible, and put in all the time you think your patient will stand for at the price you charge per hour for your services, and you too will succeed.

Most cases of pyorrhea originate from neglect to keep the teeth clean and if the patient should neglect to do so, after being cured the disease will recur and the same trouble will have to be gone through with again.

The worst cases are those that have but little deposit on the roots but a profuse secretion of pus. These must have good systemic treatment if you do them any good, as well as local use of germicides.

If your patient will not promise to keep the teeth clean after you have put the mouth in a healthy condition, refuse to do anything for him as he will not appreciate your services and will say afterward that treatment for pyorrhea is a graft.

Little Things

Great results are oft the issue of small occasions. Providence uses little things for great issues, and things despised for ends of everlasting honor.—*A. Phelps.*

Observation more than books, experience rather than persons, are the prime educators.—*A. B. Talcott.*

THE RATIONAL USE OF THE SILICATE CEMENTS

BY CHARLES C. VOELKER, D.D.S., BROOKLYN, N. Y.

(Continued from September)

Let us now ask: what are the qualities needed in the ideal cement and in how far do the new cements of the silicate type possess them? A discussion of these qualities will necessarily involve many points which have a direct bearing upon the subject in hand.

First: The ingredients of a cement should retain their original forms indefinitely, if carefully handled.

(a) The liquid should remain clear and free from flakes or crystals, or from any precipitation of whatever substance is used as a modifier; and it should not change in chemical composition or physical character if kept carefully sealed when not in use. Uniform results can only be obtained from liquids which are kept absolutely uniform. Hence, crystals forming in the liquid should be redissolved; impurities on the neck of the container should not be allowed to contaminate the liquid when it is poured or dipped out; metal caps on containers may cause trouble by altering the chemical composition and causing the formation of metallic phosphates which will blacken on exposure to sulfids formed in the mouth from decomposition of food debris. Extreme care must be observed in the care of the liquid to prevent the evaporation of the water used as a diluent of the phosphoric acid.

(b) The powder should not be capable of absorbing carbonic acid from the air on account of the basic substances which it may contain. Carbonates are thus formed which in turn give off bubbles of gas when mixed with the acid, causing porosity in the cement. The powder should also be non-hygroscopic, since the taking up of moisture from the air seriously interferes with its permanence and working qualities. This freedom from hygroscopicity is practically impossible of attainment, since it is a physical characteristic of finely divided substances to absorb atmospheric moisture, even if they be inert in solid form. From the composition of some of the silicate cements which I have given above, you will see that they contain substances such as free lime, lithium phosphate and other phosphates, sodium borate and perhaps other substances, which may absorb moisture or carbon dioxide. The powder must therefore also be well stoppered when not in use and the mix must be made with the utmost despatch when the ingredients have once been placed on the slab. It is also detrimental to the powder remaining in the bottle to replace therein any excess of powder remaining on the slab after the mix has been made.

In microscopical examinations of mixes of silicate cement manufactured in the United States, much foreign material, dirt, pieces of thread or lint, and filaments of various kinds, were found. This was not the case with one of the foremost foreign preparations, showing greater care in manufacturing technic.

Second: The ingredients of a cement should not cause discoloration of the filling or of the tooth. This would preclude the use of all metallic salts which form dark sulfids, such as iron, for instance, which forms a dark sulfid under alkaline conditions; and, as is well known, iron is the bane of the manufacturer of cements. Because of its great prevalence in nature, it is difficult to obtain iron-free materials for making cement powders. The same is true, to a less extent, of nickel, cobalt, lead and arsenic, the first four giving black, and the last yellow sulfids. All of the earlier silicate cement powders undoubtedly contained one or more of these impurities and were rightfully condemned. Since several of the newer silicate cements are claimed to be prepared synthetically, these difficulties can now be largely avoided; but it remains for us to ask: What do the manufacturers mean by a ''synthetic'' preparation? Do they take the chemical elements, such as aluminum, silicon, Beryllium, oxygen, etc., and combine them to form silicates and oxids? This would seem to be an unnecessarily expensive process, when it is possible to obtain the pure chemical compounds from a reliable firm of manufacturing chemists.

Sometimes silicate cement fillings which seem badly discolored may be restored to almost their original color by disking off the surface discoloration which is due to the same causes which discolor the teeth.

Third: The ingredients of a cement should be free from deleterious substances which might cause harm to the dentin or the pulp of the tooth. The danger of discoloration of the dentin I have already touched upon: but the danger to the pulp is probably the most important single factor affecting the use of the silicate cements. I shall feel fully repaid for the time and effort required in the preparation of this paper if I succeed in laying for all time what, after more than eight years of experience in the use of this material, I personally feel is more of a chimera than a realty, provided ordinary precautions are taken by the dentist—the man behind the gun—to safeguard the vitality of the pulp.

There are two substances around which the storm of debate on this subject of pulp destruction has centered ever since the first cement was introduced over sixty years ago. They are (a) Arsenic, and (b) Phosphoric Acid. As possible other causes of harm, aluminum phosphate and hydrochloric acid and its salts have been blamed in recent years, the latter two being new bogies conceived, it seems to me, by those having either a contention to sustain or a desire to extol a favorite article at the expense of some other.

(a) About twenty years ago our literature contained much argumentation pro and con regarding the presence of small traces of arsenic in the oxyphosphate cements and their possible deleterious effects on the tooth pulp; but the contention, as it affects the oxyphosphates, has long since been practically abandoned as untenable. Dr. W. V-B. Ames has shown, by actual physiological experiments, the harmlessness of such slight traces of arsenic as might possibly have occurred in the older cements. He also showed quite conclusively that in the calcining of cement powders, any arsenic in whatever form it may exist in the powder is combined with the zinc in the oxid to form arsenite of zinc and is rendered inert in the small quantities which could occur in these powders. A compound containing as much as seven per cent. of arsenic in the form of arsenite of zinc was shown to have no effect on a tooth if sealed into it for a period of three weeks. The proportion of this compound in the manufacture of the older cement powders was so infinitesimally small as to be negligible; and I feel convinced that the statements of the manufacturers of the newer cements, to the effect that their products are free from arsenic, may be accepted with complete confidence at their face value. Affidavits to this effect from competent chemists within our own ranks could be easily obtained.

(b) It is harder to prove the innocence of the phosphoric acid ingredient of our silicate cements. The question: Is the death of the tooth under a cement filling ever due to the filling itself on account of the presence of free acid or acid salts, provided the pulp be healthy and well protected by sound dentine at the time the filling is inserted? is still an open one. For myself, as the result of careful clinical observation and recording over a period of more than eight years (which I shall mention more in detail later on), I should unhesitatingly answer in the negative. I have had a very few deaths of pulps under silicate cement fillings; but in all cases I feel convinced that it was the result of my own lack of judgment in not removing the pulp first in deep cavities or in not lining them. There can be little doubt that the acid used in all cements would prove a dangerous irritant, especially if the meta- or pyro-phosphoric acid were used pure or as modifier of the liquid, provided it could reach the pulp in quantities large enough or for a period of considerable duration; but I consider it practically impossible if the material is used rationally in cavities where it is indicated, on account of the nature of healthy dentin and the contents of its tubules. The danger may be largely done away with by the method of treating the cavity which I shall mention in my explanation of the technic I employ when using the silicates.

In his researches, Dr. Kulka, of Germany, tells us that the experiments of the investigator Pringsheim showed that a chemical substance, in order to penetrate a colloidal plate, must first satisfy all the affinities of the material in each layer of the plate before it can penetrate further. It took even the strongest acids, such as sulphuric and hydrochloric, at least eight hours to penetrate dead ivory to the extent of only .3 of one millimeter. We must also keep in mind that we do not place a pure acid in our tooth cavities, but rather a cement mixture or chemical compound containing an acid salt; and the amount of free acid in a mix of silicate cement which had been left standing for forty minutes was so small that it seemed to Kulka "questionable if it could penetrate even the smallest layer of dentin, especially as it is very difficult for chemicals to pass through media of the consistency of dentin." It was shown that the liquid contents of mixes of Ascher's Artificial Enamel and of Harvard Cement did not penetrate ivory plates only .3 of a millimeter in thickness even after twenty-four hours; while Harvardid, Astral, Schoenbeck's and Phenakit penetrated to such a slight extent as to be freed from suspicion. There will, of course, be free acid present if the cement be improperly mixed, i.e., too thin, causing an unbalanced chemical mixture and a slow binding of the acid. In deep cavities, unprotected by a cavity lining, this may cause irritation of the pulp; *but the pulp may die under any kind of a cement filling.*

Another thing must be borne in mind in this connection, and that is that in deep-seated caries the pulp may have become seriously infected or pulp stones may have formed; and such pulps are really to be looked upon as being in various stages of degeneration, sooner or later doomed to death regardless of whether the filling inserted be silicate cement or not. Dr. Ottolengui put the whole thing in a nut-shell when he said: "Dentists often decide to give the pulp the benefit of the doubt, whereas in all such conditions they should give the patient the benefit of the doubt by removing the pulp." Many thousand gold and porcelain inlays and gold crowns are set every year over vital pulps, using thin mixes of cement in which there are undoubtedly present free acid or acid salts; and yet we do not hear many complaints of death of pulps from this cause if proper precautions have been observed. I fully believe that the time has come to relegate the question of the danger of the acid content of the silicate cements to the pulp of the tooth to the oblivion which has overtaken the arsenical question mentioned above.

About two and a half years ago a German writer started what threatened to be another controversy by saying that certain experiments made by another investigator on animals had proven the poisonous nature of aluminum phosphate, and that we should be careful in using silicate cements containing it. But his conclusions appear to me to be far-fetched, and nothing more seems to have come of them. More recently, another German investigator and originator of a silicate cement endeavored to prove the presence of hydrochloric acid or its salts in other cements than his own, and in this case, too, a mountain seems to have been made of a molehill.

Fourth: A cement should not contract or expand. Even a single micron (the one-thousandth of a millimeter) of space between tooth and filling will permit the passage of the oral fluids and their contained bacteria and thus tend to recurrence of decay. The recent work of Dr. Proell, of Koenigsberg, Germany, has proven that death of the dental pulp under cement fillings is more of an infectious than a chemico-toxic process. Silicate and zinc oxyphosphate cements exhibit changes of volume in the mouth secretions at body temperature—generally a contraction which impairs marginal integrity. Dr. Proell advises the avoidance of dryness of fresh or even of old silicate cement fillings after they are once set. The danger from expansion is self-evident.

In the specimens which I shall pass around for inspection with the magnifying glass, comparison with the points I have noted may be made. The fillings were put into freshly extracted teeth which had never been allowed to dry out, and were made with all the care that I take in making fillings in the mouth. They were made with two of the foremost silicate cements, and as you will see there is little to choose between them, as to appearance, color, translucency, etc. After the cavity was prepared in each instance, the filling was inserted, allowed to set for one-half hour, and either finished off immediately and varnished or varnished before polishing. Then they were placed for two hours in warm fresh saliva. If they had not been finished before varnishing, they were then finished, and all kept wet by being placed in a one per cent. solution of formalin until the present time. I agree with Dr. Proell that it is best to keep silicate cements wet after they are once set, and not allow them to become dry, on account of the danger of shrinkage and the entrance of the bacteria of caries between tooth and cement.

Fifth: A cement should set completely and perfectly in as short a time as possible. There are three stages in the setting of dental cements:

The first is a fluid stage, when the ingredients are mixed and a chemical union takes place between them with a thickening to the point at which the mass may be kneaded (as between the fingers). This stage is followed by the second, which is a plastic condition of the mass, which gradually hardens, and during which more or less heat is evolved. The last stage, finally, is the one in which the real setting or crystallization of the mass occurs, with a complete chemical union and neutralization of the ingredients. When this stage is complete (and it sometimes takes quite a long time), all the good or bad qualities of a cement will be developed. A cement may become hard, but the point of complete neutralization may not be reached for hours or days thereafter. This was particularly true of the older silicates. Here again is seen the necessity for a cavity lining and the avoidance in all cases of dehydration of the dentinal tubules by means of alcohol and hot air. So long as there is any acidity in a cement, it contains a soluble portion capable of being carried away by the mouth fluids; and a long-delayed setting process exposes the tooth to the action of any free acid or of acid salts that may be formed in the mix. Some of the newer silicates have an initial set within five minutes, while others take almost half an hour to harden.

Sixth: A cement should not develop great heat while setting. In experiments made by me in this connection, I found the following results, using five of the different silicates now on the market and one old one: Archite, in six mixes, made with a room temperature of 70 deg., gave a minimum temperature of 104 deg. F. and a maximum of 121 deg. F. Havardid, Berylite, Translucin and Synthetic Porcelain varied from 82 deg. to 85 deg. F. Ascher's New Artificial Enamel varied from 84 deg. to 94 deg. F.

In some further experiments made along this line, Dr. S. Read, of England, reports that the temperature at which the silicate cements set is very high indeed and varies with each mix. The highest temperature recorded in these tests was 170 degrees and the lowest 84 degrees Fahrenheit. I still have some boxes of the old Archite, which I find very serviceable for laboratory purposes on account of its rapid setting. It will soften Kerr's Perfection Modelling Compound when pressed into an impression in that material. Too much heat will, of course, produce pain in the tooth and in deep cavities may start up a pulpitis.

If the filling is coated with cocoa butter, wax or other greasy material, the heat developed in setting may melt these substances slightly, causing them to be absorbed into the still porous mass and giving us another source of discoloration. Too much heat developing in the second stage of setting, while the mass is still plastic, may cause such rapid setting as to prevent the mix being used for a filling. This happens particularly in hot weather, when the heat of setting, combined with the high surrounding temperature, requires to be taken into careful consideration.

Seventh: The setting of a cement should not be affected by climate or temperature, i.e., the setting qualities of any given cement should be the same, summer or winter, in moist or dry climates. This, and the production of insolubility and translucency, are the most difficult problems in the production of a perfect cement. I have only to mention to you the copper cements, Iodoformagen, Archite, and such quick setters as Vyvex, Calxine, Lithos and others among the oxyphosphates, to bring vividly before your minds what happens on a warm day in summer when you make a mix of any of these cements in the same manner that you would do in the winter time. The silicates set much more rapidly in summer than in winter. Therefore, a large glass slab, quite cool, and an agate spatula of large size, should be used in the summer time, and the insertion of the cement should be performed quickly.

Eighth: A cement should be dense in structure and free from porosity. If these qualities are lacking, water and the organic acids sometimes present in the mouth will enter and dissolve the filling. Dr. Proell is authority for the statement that "doubtless a considerable quantity of liquid penetrates dental cements, but their permeability by water and ether has so far not been proven experimentally."

My own experiments show that colored liquids, such as a solution of carmine or an oily solution of liquid asphalt, will penetrate into the mass of thin layers of silicate cement spread on glass, and that the penetration may be observed with the microscope, using magnifications of 25 to 100 diameters. Observation of the surface of a mass of silicate cement, using reflected illumination, will leave no doubt as to the porosity of these fillings, and penetration of colored liquids can be shown on cross-section. In thin sections on glass, using transmitted light through the substage condenser of the microscope, the mass shows very granular structure and light penetrates it in very bright spots throughout the mass, as though it were porous. Further experiments are needed to confirm this.

Ninth: A cement should be insoluble in the secretions of the mouth. It has been said that the best cement is the one that has this characteristic developed highly, even at the slight sacrifice of all remaining qualities, or at a great sacrifice of a property of minor importance. To be sure, almost all things are soluble in water, the great solvent; yet a perfectly combined, quickly setting cement will probably be more durable than one which is slower setting, since chemists have found that where a cement is slow in setting during the last stage, soluble chemical salts are present. It has been shown, furthermore, that the silicate cements are practically insoluble in alkaline solutions, but that even one per cent. of hydrochloric acid will dissolve them. Thus we see the necessity of keeping the mouth acid-free by the same means which are used in the treatment of erosion of the teeth.

Tenth: A cement should be hard and show high resistance to pressure after setting. There are three factors recognized as necessary to secure these qualities—correct chemical make-up, rapidity of setting, and fineness of the powder. A resistance to pressure of as much as four hundred pounds has been recorded in some of the quick-setting oxyphosphate cements of the present time, while cements which set slowly take a long time to attain such resistance. The present silicates are far from being as hard as porcelain, nor do they have the strength of the latter, and are not indicated for the restoration of inciso-approximal cavities, nor in places where large contour is required. They may, however, be used with confidence on the occlusal surfaces of molars and bicuspids, and even on incisal edges and lingual surfaces where the opposing teeth strike them. Some of the silicate cements are so lacking in hardness that after setting they may be crushed to powder with little pressure applied with a lead pencil, and they may be ground away almost like chalk with fine sandpaper disks.

Eleventh: A cement should be very adhesive. This is a quality almost entirely lacking in practically all the true silicate cements, and necessitates the use of deep undercuts and sometimes the lining of the cavity with soft oxyphosphate cement into which the silicate may be pressed. We can only hope that continued research will disclose something besides the zinc, copper and magnesium compounds, which thus far have been found necessary to obtain good adhesiveness.

Twelfth: A cement should be hydraulic in the sense in which Portland cement is hydraulic, and should not require a protective covering after it has once hardened. The time of complete setting should thus be quite rapid and the action of moisture should be actually necessary after it has hardened to develop the hydraulic quality in the highest degree.

This is seen in some of the oxyphosphates, and would be of great advantage in those of the silicate type. The manufacturers of some silicate cements claim to have reduced the phosphoric acid content of their liquids to a minimum, but the fact that they supply and advise the use of varnish to coat the filling after it is set and finished and before the rubber dam is removed, implies that these cements are not of the truly hydraulic character required for dental cements, the hydraulic index being low.

The time of complete setting is given in the literature accompanying different silicates as varying from one hour to twenty-four. In the Standard Specifications for Cement of the American Society for Testing Materials, the time of setting of Portland cement is given as follows: "It shall develop initial set in not less than thirty minutes, but must develop hard set in not less than one hour." This refers to ordinary temperatures. Prof. F. P. Spalding, in his work on "Hydraulic Cement," has shown that cements which would require several hours to set when mixed with water at a temperature of 40 degrees F., *will set in a few minutes if the temperature be raised to 80 degrees.*

We should have worked out and published for us by a competent physicist the hydraulic indices of the silicate cements on the market. The hydraulic index of Portland cement is the ratio of the sum of the weights of silica and alumina to that of lime in it, the two former being considered the effective hydraulic ingredients. Portland cement has an index varying between 42-100 and 60-100, and permits the admission of water to it in from one to five hours, according as it is quick, medium or slow-setting. The chemical content of the liquid of the silicates, phosphoric acid, is probably the essential differentiating factor which prevents us considering these as true hydraulic cements.

I believe that the question of moisture and the protection of cement fillings against it has never been more clearly put than it has by Herman Fleck, Ph.D., Professor of Chemistry of the Colorado School of Mines, to whose writings on the subject I am greatly indebted. He says:

> "In many cases these shortcomings are recognized by the compounder, who includes a varnish or wax in the package and advises the use of these. Such coverings are of doubtful use, for several reasons, readily understood. The alcohol acts upon phosphoric acid, thereby changing the composition of the surface material. All cements in moist condition do not take to varnish or wax, and even when firmly set it has been shown that the surface of the cement gives off water vapor. When a cement requires protection from water it is because its liquid is supercharged or its powder constituents contain insufficient neutralizing material. Provided that a covering material is found that will adhere at all, its duration is not long. The slightest disturbance will cause leakage through it. To have a cement so prepared as to *require* moisture after a brief period goes a long way towards constant results."

This last sentence by Dr. Fleck is in accord with what I have said above regarding the desirability of a truly hydraulic, quick-setting dental cement. Another serious objection to some of the varnishes furnished with the silicate cements is that they are dissolved in ether, chloroform or wood alcohol, and I have lately had numerous complaints from patients, especially women, to whom these substances are most disagreeable.

Thirteenth: A cement should be translucent and refract light at the same angle, approximately, as tooth substance does. This question of translucency strikes me as the most difficult of all to solve. Some of the newer products, such as Ascher's New Artificial Enamel and de Trey's Synthetic Porcelain, often give us results which leave little to be desired, but the results of mixes made under exactly the same conditions and from the same box of powders are by no means uniform. The greater translucency of the present-day silicate cements, as compared with the earlier ones, is probably due to the presence of an increased amount of transparent silicic acid, although aluminum oxid and Beryllium compounds are claimed to be the principal producers of translucency by some manufacturers. Silicic anhydrid or silicic acid may be obtained in a pure state as a gelatinous hydrate by dialysis of basic silicates, the final product being an insoluble anhydrid SiO2, which results from driving off the water. This may be added to the cement powders to increase translucency. Of course, when mixtures of silicates of lime and aluminum containing oxids are combined with a modified phosphoric acid, there is probably formed a mixture of calcium and aluminum oxyphosphates admixed with silicic acid.

None of the silicate cements possess, in my opinion, the quality of translucency to as great a degree as does porcelain, provided the latter be not rendered opaque by a thick mass of oxyphosphate cement behind it—an island of porcelain in a sea of cement.

The thirteen qualities which I have enumerated as necessary to the ideal cement may, with few exceptions, be considered as essential factors in that most important attribute of any filling material, namely, durability. The ideal of durability as applied to any filling material may be said to comprehend the permanency of gold, the insolubility and esthetic effect of porcelain, and the adaptability and safety of gutta-percha. My ideal of permanency is illustrated in the mouth of one of my patients, whose front teeth contain almost perfect gold fillings put in by Dr. Riggs, of New Haven, fifty years ago. My ideal of the esthetic is that of a very few porcelain inlays out of several thousand which I have examined, which are not visible at "speaking distance;" and my ideal of adaptability and safety is that of gutta-percha—non-conductive, non-friable and insoluble.

The combining of these attributes in one product is a problem worthy the master-minds of the brightest chemical and technical experts that the future may produce. Until this is accomplished we must continue to tell our patients that *a silicate cement filling is only semi-permanent,* so far as we know at the present time, but that it is probably far more permanent than any of the old oxyphosphate cements. I feel warranted in telling my patients that these silicate cement fillings will last from two to five years, or even longer, and the ease of preparation of the cavity and of insertion induces many of them to declare in their favor (even though they may have to be replaced at intervals) rather than to submit to the discomfort and often great loss of tooth substance required for the insertion of gold or porcelain. The time of five years as the duration of a silicate cement filling was considered very satisfactory in the opinion of the chemical expert connected with the manufacture of a silicate cement now largely used, who demonstrated its manipulation to me.

Many failures have resulted in the past because these cements were treated in mixing like oxyphosphates, and little regard was had to the kind of instruments used and to other important details. Among the early causes of failure were: Omission to use the rubber dam when inserting a silicate cement; the use of steel or German silver instruments; mixing the cement too thick and near the setting point, making proper manipulation and condensation to cavity walls impossible; mixing too thin and permitting a large excess of acid, with resulting slow setting and tendency to porosity and other evils; the use of vaseline or other oleaginous substances as lubricants for instruments used in insertion and finishing; the removal of the rubber dam too soon, before the mass had fully set; the lack of correct cavity preparation and dependence on a non-existent property of adhesiveness; the desiccation of the tooth, with consequent tendency to irritation from free acid or acid phosphates in the mix; and the failure to protect the pulp in deep cavities. There were, of course, certain defects in the older silicates when first presented, and even within the last three or four years, which were the causes of failure, some of which I have already attempted to point out. But with a gradual perfection of manufacture and the closer study of the material which is going on all over the world, especially in Germany, we may expect increasingly better results

The cavity having been prepared, it is absolutely essential that the rubber dam be applied and made water-tight before proceeding to sterilize and dry it. Undercuts are always necessary, since the silicate cements are not adhesive. If the cavity is very sensitive or deep-seated, it should be lined, preferably with a non-irritant cavity lining like Fletcher's Artificial Dentine. The enamel margins should not be bevelled and should be free from any traces of the lining material. In no case should alcohol and hot air from the chip blower or other source be used to dry the cavity. Alcohol is the great dehydrator, and if it is used it will withdraw the liquid contents of the dentinal tubules, and when evaporated, either with or without the hot air blast, it will leave the tubules open, making the dentin almost like a sponge. These million tiny tubules will then draw up by capillarity any free acid or acid salt in liquid or semi-liquid condition in the fresh and plastic cement, with resulting irritation of the dentin and even of the pulp. We should remember that the dentinal tubules are supposed to be filled with a fluid-like substance, highly sensitive to shock of any kind.

The method of sterilizing and drying the cavity which I use is to swab it lightly (after every particle of softened and carious dentin is removed) with pure phenol in liquid state, full strength, which has a tendency to coagulate the albuminous contents of the tubules for a very short distance and seal them for a certain depth beyond the cavity walls; and to follow this with an instantaneous application of pure chloroform on a swab of cotton, which is evaporated either naturally or by means of an instantaneous blast from a chip-blower. This dries the cavity without dehydration of the dentinal tubules. I have never had a serious objection from a patient to this method, although it sometimes causes a momentary feeling of pain; and I attribute the freedom from irritation of teeth filled with cement to the non-use of alcohol and hot air in deep cavities.

The cavity being all ready, the powder is placed about the middle of a large glass slab six inches long by three inches wide and one inch thick. Those made of Carrara glass are excellent and may be kept exclusively for this purpose, and on account of their whiteness and opacity are easily distinguished from others. The quantity of powder to be used in proportion to the liquid varies with the kind of cement, each manufacturer advising a somewhat different amount for his product. It is best, at first, *to follow to the letter the directions accompanying the cement* until sufficient personal experience has been gained to permit slight variations as expediency may dictate. Usually from two to three times the amount of bulk in powder is required for each drop of liquid used. The liquid is placed on the slab a short distance from the nearest mass of powder (which may be divided for convenience into two or more parts). It should be placed on the slab with a glass rod or small pipette, which is furnished with the liquid bottles. Two or three drops are sufficient for even large cavities.

The next step is the mixing, which is probably the most important single factor in the success or failure of any particular mix made with the silicate cements, and it is here that is illustrated that peculiar kink in human nature which makes us suspicious of innovations and impatient of exacting detail and which makes it incumbent upon the manufacturers to perfect any given article of general use to a point where even the novice may expect fairly good results with it from the beginning. I confess to great laxity in mixing in my early use of these cements, and the great length of time some of my first silicate cement fillings have remained in good condition is evidence that the material was fairly dependable even under adverse conditions.

In mixing, a properly shaped agate spatula should be used, as it does not contaminate the mix with foreign particles which may be ground off by the sharp crystals of the cement powder, as happens with bone or ivory spatulas. Metal spatulas, even of tantalum, should never be used. In mixing, also, the directions of the manufacturer should be exactly followed for each kind of silicate cement.

About one-and-a-half to two times the bulk of powder in proportion to the liquid is rapidly drawn into the latter and spatulated with a rotary motion, the spatula being flat on the slab. When thoroughly spatulated, successively smaller amounts of the powder are added until the mass begins to become quite sticky. Before adding each new portion of powder, the mass already spatulated should be scraped from the slab with a sweep of the spatula lengthwise of the slab and replaced with a rocking to and fro motion, in order to thoroughly incorporate powder and liquid, until a homogeneous mass is obtained. The point of proper consistency is reached when the mass has a tendency to follow the spatula when it is raised, yet it should continue to stick to the slab. When the spatula is pulled away from the mass the latter should not settle back to a rounded shape but should retain a pointed cone shape.

The main point in insertion of the filling is to work very rapidly so that it will be in place before crystallization of the mix has proceeded very far. Only tantalum, tortoise-shell, agate or other non-corrodible instruments should be used. The first portion of cement is placed in the cavity and condensed to the margins, working from the center outward. The middle portion is then filled in under considerable pressure and a piece of glazed linen or celluloid strip, very thin, is placed over the filling and even pressure is applied by pulling the strip against it. By this time, crystallization is well advanced, *and I would caution against burnishing over the strip in order not to break up the surface of the partly crystallized mass.* The strip should be held with the fingers firmly against the filling for about three minutes. Then the patient should be told that it will require at least twenty minutes for the filling to harden before it can be finished and the rubber dam removed. A half hour is better, but not always practicable. The twenty-minute rule I have never deviated from in the last four years, since a number of failures, due to a too hasty removal of the dam, perhaps, made me more careful. I do not coat the crystallizing mass with cocoa-butter or grease of any kind for the reasons I have already given. I believe that the slight amount of water vapor that may evaporate from the surface of the filling is so very minute as not to be detrimental to success.

From twenty to thirty minutes after completing the insertion of the filling, it should be finished with the rubber dam on, if possible; otherwise it may be coated with a varnish and the patient dismissed, the finishing being done at a subsequent sitting, since it is not always possible to properly finish a silicate cement filling with the rubber dam in place. The finishing is done with fine strips and disks, the latter being used with a light touch and with the engine running slowly so as to avoid heating the filling. I may say that I have seen a great many silicate cement fillings to which access of the mouth fluids was permitted within fifteen minutes after insertion, and which were finished after removal of the dam, which were in excellent condition after five or more years had passed.

(*To be continued*)

Most people would succeed in small things if they were not troubled by great ambitions.—*Longfellow.*

A METHOD OF CLOSING A SINUS BETWEEN THE ANTRUM OF HIGHMORE AND THE MOUTH*

BY L. W. DEAN, M. D., IOWA CITY, IOWA

THE TOPIC WITH WHICH THIS PAPER deals has been chosen for three reasons: *First*, because I have had so much difficulty myself in eradicating these sinuses; *second*, because I see so many sinuses left after others have operated; and, *third*, because a search of the literature has failed to furnish very much information regarding the technic of such a procedure. Since selecting the topic I have operated in twenty-three such cases. They were all cases of alveolar necrosis with antrum involvement, with the exception of two cases; or they were cases of permanent sinus following an operation for antrum suppuration secondary to alveolar necrosis. The two exceptions were: *First*, a large infected dentigerous cyst, lying external to the antrum. This was drained into the nose through the antrum. And, *second*, a case of composite follicular odontoma which was also drained into the antrum and through it into the nose. With the cases of alveolar necrosis and Highmorian empyema a Denker operation with the complete removal of the necrotic bone was performed.

Various methods for closing these sinuses were tried. Those tried at first gave uniformly bad results. The perfected operation gave about 95 per cent. good results. I will describe simply the technic of that part of the operation which was performed after completing the Denker operation, and also the various methods attempted in the order in which they were tried:

First, I remove the necrotic bone and then the inferior portion of the alveolar process. Just enough of the latter was removed to bring the periosteum of its inner and outer surfaces together. The two layers of periosteum were then sutured with interrupted sutures of black Chinese silk, No. 4. These sutures did not hold but tore out within a few days, notwithstanding the fact that they were carefully cleansed every two hours with hydrogen peroxid.

Second, the periosteal flaps were prepared the same as before, and, using the same silk, by means of double-armed sutures the threads were introduced from within out, just above the bone. These sutures held better than the first but tore out in two or three days.

It was now manifest that Chinese silk was not the proper substance for suture material. It would become soaked with saliva, swell, and naturally become crowded with micro-organisms. It was quite impossible to keep these sutures clean.

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*Read in the Section on Stomatology, of the American Medical Association, of which THE DENTAL SUMMARY is the representative organ for the dental profession by special arrangement with the *Jour. Amer. Med. Asso.*

Third, silk-worm gut was substituted for Chinese silk, as in the second method. These sutures could be kept clean and held several days longer than the others, but not long enough to secure healing. The silkworm gut would cut through the mucous membrane and the periosteum.

Fourth, various substances as gauze, pieces of rubber tube, lead plates, etc., were placed within the loop of silkworm gut, on the inner surface of the alveolar process and a second piece placed underneath the outer ends before they were sutured. This was done with the hope of preventing the sutures from cutting through the membrane and periosteum. The pieces of gauze which are so successful in similar sutures on the skin could not be kept clean in the mouth and soon caused trouble. The lead plates were much more difficult to apply than the rubber tubing and had a tendency to cut the membrane. Whole pieces of small rubber tubing or pieces cut longitudinally in halves were used. These sutures would hold nicely for from five to seven days, when they would tear out and the sinus would be re-established but not so large as before.

It was evident that the cause of our trouble was not now due to the suture but to the fact that sufficient bone was not removed to allow apposition of the periosteum without too much tension on the suture.

Fifth, the method which I consider the very best was used. It is the one that we have used in the last half of our operations and, while it has not been successful in every case, it has given us 95 per cent. good results. The method is as follows: After completing the Denker operation and being sure that there is excellent drainage into the nose, the alveolar process is attacked. After removing the necrotic bone completely, enough of the inner and outer lamella of the alveolar process is removed to allow of perfect apposition of the flaps that have been previously lifted from its inner and outer surface. These flaps must come nicely together so that it is not necessary to have any tension on the sutures. Then I place along the inner and outer surfaces of the alveolar process at this point a piece of small rubber tube sufficiently long to allow it to be tucked underneath all the sutures; then using double-armed silkworm-gut sutures, a sufficient number are introduced from within out, the loops resting on the rubber tube on the inner surface of the alveolar process, the knots being tied on the rubber tube on the outer surface of the alveolar process. Care should be exercised to tie the sutures just tight enough without getting them so tight as to produce pressure-necrosis of the flap. These sutures are cleansed hourly with hydrogen peroxid following the operation. The nurse must be exceedingly careful to clean in and around the sutures and tube thoroughly. If this operation is done at the time of the antrum operation the incision for the Denker operation is made high up and is entirely separate from the incision on the border of the alveolar process. The periosteum, from the outer surface, is elevated completely without being torn and handled with great care, while the necrotic bone is being removed and the inner and outer lamellæ of the alveolar process are being cut down.

With every case of necrosis the operator must exercise his individuality in making the cut on the border of the alveolar process so as to get the best possible apposition of periosteum. The results of this operation have been surprisingly gratifying to me. As a rule the wound margin remains clan, the sutures remain clean, and when they are removed, on from the seventh to the tenth day, leave behind a well-healed wound. When I attacked this problem last summer I did not expect such gratifying results. It is an operation that I can recommend for trial.

ABSTRACT OF DISCUSSION

Dr. Thomas L. Gilmer, Chicago: I should like to ask Dr. Dean if the operation he described for curettement of the maxilla is not similar to the Caldwell-Luc operation.

Dr. Dean: The Denker operation differs from the Caldwell-Luc operation in that the incision is on the anterior wall of the bone. It is practically the same operation.

Dr. Truman W. Brophy, Chicago: I congratulate the author on his success in closing the sinus, but in my experience the greatest difficulty is in keeping it open. Most surgeons find it difficult to keep it open until the cavity is in a healthy condition. When I succeed in doing this, I always feel that I am fortunate.

The question of sutures within the mouth has been to me one of the great problems. In my earlier experience I had the same results with silk that Dr. Dean has had; I, therefore, abandoned long ago the use of anything in the mouth that would absorb the secretions, using only silver and horsehair sutures and lead splints. I have had trouble in finding horsehair that could be relied on for sufficient strength for this purpose. It may be kept in the mouth a month, if necessary, without causing any irritation.

Dr. G. V. I. Brown, Milwaukee, Wis.: Some time ago I was operating where they had the most satisfactory horsehair that I had ever used. The hospital authorities took the hair out of the tail of the ambulance horse and boiled it. Prepared in this way it was soft and pliable and not brittle. Sometimes, however, I have found it treacherous. We never have had any infection from it in the hospital, where it has been used a long time.

Dr. C. H. Oakman, Detroit: In antral cases in which the palatal bone is necrotic I seldom find it necessary to divide the soft tissue overlying the hard palate, but rather cut high above the teeth or amputate the roots of the molars or bicuspids, making a wound sufficiently large through which to remove the necrotic bone. Within the last eight months I have successfully treated four or five cases in which a portion of the palatal bone was necrotic in this manner. In chronic cases, in which the adjacent sinuses are liable to be involved, I fit a vulcanite plug into the wound. This is held in place by the cheek and affords the necessary drainage. In this way the topography of the palate is little affected, which I believe to be of the utmost importance.

Dr. Truman W. Brophy, Chicago: About three years ago I found that the hair of the tail of a bull is much softer, larger and stronger and will endure a great deal more tension than horsehair. It sustains 25 per cent. more weight than horsehair.

Dr. L. W. Dean, Iowa City, Iowa: I appreciate the discussion regarding the kind of horsehair which should be used. I did not mention the use of horsehair in my paper. It was tried, but its quality was so poor that it gave no satisfaction.

THE DENTIST'S RECEPTION ROOM *

BY E. L. PETTIBONE, D.D.S., CLEVELAND, OHIO

THE PAST TEN YEARS have brought about many changes in dentistry, one of the greatest being the transition from the old style waiting room, with its gold-fish aquarium, nude statuary, hideous oil-paintings and miscellaneous furniture, to modern dentist's reception room with its harmonious artistic arrangement of furniture, decoration and floor coverings.

The reception room should be light and cheerful, sunlit if possible. The furniture should be carefully selected, of similar design and color and substantially made. The rattan or wicker furniture is very artistic and attractive, but after considerable observation and inquiry I have concluded that the most serviceable and artistic and best suited to the needs of the average dentist is that furniture of the mission type finished in fumed oak—the wax finish—with the dark red seal leather cushions. This type of furniture has been installed in the new Y. M. C. A. buildings where it receives the hardest possible kind of wear and has held up admirably.

The decoration of the walls should be left to a competent decorator who will arrange the decorating to conform to your general color scheme. A plain or two-tone paper will show your pictures to the greatest advantage and has the most pleasing effect. The graduating class picture has no place in a modern reception room. It is of inestimable value to you as a reminder of those happy associations of your college days, but it is absurd to impose it upon your patients while awaiting dental services. Would not an appropriate nature study be far more liable to have a quieting effect upon a nervous patient?

The Parthenon or Coliseum are preferable to "The Doctor" or "The Anatomy Lesson." Why not have some of your vacation pictures enlarged and framed to take the place of those class pictures?

Do not decorate your reception room with skulls, skeletons, tooth paste calendars or posters. Have your window draperies arranged to admit as much light as possible, and if you want the very nicest kind of artificial light use the semi-inverted light fixtures.

Your patients want something they can glance over or read in just a short time, so your reception room table should have attractive literature. I have found by observation and inquiry that my patients appreciate most light, cheerful reading such as is found in "Life," "Cartoons," or "Field and Stream." I also have "Everybody's," "McClures," "American" and "Hearst's" and "Good Housekeeping," and I try to have them of the current year.

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*One of a symposium of papers read before the Cleveland Dental Society, 1914.

For the Saturday morning's little patients I have a very large pile of comic supplements. They will read these over week after week and bring their pals with them to read them too.

The best floor covering is a Brussels or Wilton rug, which will keep the dust down but can be still kept perfectly sanitary with a vacuum cleaner.

You all know the value of a favorable first impression and I want to impress you with the all-importance of cleanliness as a paramount necessity about the reception room.

Your greeting may be ever so sincere, kind and assuring, but if your reception room is dirty, dusty or gaudy you and your work are a failure with the right kind of people.

DISCUSSION

Dr. Varney E. Barnes: The author's remarks in regard to the selection of the light, cheerful, sunlit room, with carefully-chosen artistic mission furniture and wall decoration in conformation with the general color scheme, are certainly to be commended. This room, as well as all the others, should be artistic, for the best dentist is also an artist.

The artistic room must of necessity produce a soothing effect upon all who enter it save possibly the pain-crazed or the bore. However, this effect will be of little consequence if the dentist himself be not artistic in attitude and achievement.

The room should be considered as the first means of preparing the patient. Impressions of beauty and cleanliness, which it may give, must necessarily impress that patient and, consciously or unwittingly, give him or her some confidence in the operator who may be expected to give a greater consideration to a human being.

Some years ago, when fitting up my present office, I purchased the kind of furniture advised by the essayist and have found it serviceable, beautiful, artistic and economical. At that time I had consulted a friend who had made interior decoration his life work. He advised the purchase of the furniture as well as specifying the rugs and wall colorings, saying that the room should be so furnished and decorated that one entering it would feel pleased with it and yet go out from it and not be able to name any one thing about it which would seem to attract attention or cause comment. He said that such a room would not become tiresome and would always be pleasing. The careful observer will here note that the effect to be produced by the artistic office is simply the same as that produced by the best dentist—the highest art being in the concealment of that art.

The class picture becomes tiresome, but so will all others mentioned, though not so soon. The enlargement of vacation pictures may be of great interest and, if well chosen, often gives pleasing effects. However, it is well to change pictures about in the office and from room to room and from home to office and vice versa. One particular advantage in the well-taken and chosen vacation picture lies in the fact that no one else has it. The changing of pictures from time to time creates new pleasures and interest.

The remarks in regard to periodicals and literature which offer short readings and are of the most recent issue are to be heartily approved. Aside from old magazines being useless and mussy we must remember that they are also liable to be transmitters of disease. The large pile of "Comics" mentioned by the essayist should be reduced to a few clean ones.

Along this idea of entertainment in the reception room where children often wait while the parent is out shopping, I have hit upon the plan of furnishing a good set of the new Mechanno toy, which allows the child to construct all sorts of mechanical toys, from carts to derricks. This happy thought has solved quite a problem of entertainment and quiet, as well as proving of great interest to both girls and boys.

I am going to disagree with the essayist in regard to the rugs. The well-preserved antique Oriental rug will prove be the most artistic and may wear the best if it be of the rougher textures such as the Kazak or Dakhastan, but the present prices of such coverings make them prohibitive to all but the few. Undoubtedly the best rug is the Hartford-Saxony, which may be had in many colors, designs, sizes and to order, or it may be bought in standard sizes.

The floors under and about the rugs should be varnished or shellaked so as to permit washing and dusting and the maintenance of cleanliness.

There are a few things I wish to call attention to, the *first,* being clean, cool, fresh air in the reception room. The odor of creosote, carbolic acid, gas or other drugs or of burnt-out air, are all particularly displeasing to patients and, aside from this, they certainly do not fit one to enter the operating room with even the least bit of the right sort of preparedness. However pleasant you make your reception room in appearance, it will be of no avail if it does not smell clean.

Second—Keep the outer door shut—sneak thieves are less liable to reconnoiter in the hall and later slip in at an opportune time.

Third—Have the entire room visible from the door of the operating room. This will save you or your assistant much time and confusion. I have found a large mirror, hung on the wall in the reception room at the proper place, to be a great time and energy saver, as the assistant sitting at her chair before the desk some eight feet from the operating room door can see every chair in the room but one and can see all who enter the reception room. The entrance to the operating rooms requiring a right-angle turn cuts off much interruption while the doors are still left open.

Fourth—Unless your patients are of the more ignorant class, the almost universal sign *Walk In* is unnecessary and to many will certainly convey the impression that you need that class to keep you going, whereas, if you are of some account you will be sought. The words ''Entrance'' or ''Reception Room'' seem to be much better if any such word is needed. Your sign on the door makes the first impression on the patient, make it dignified and simple, a plain statement of fact.

Fifth—Certain practices may call for entrance through the reception room and exit from another room—this will undoubtedly be advisable in the case of older patients who do not want anyone to know that they may visit the dentist for fear that some one may know that they are wearing false teeth. Many old women have this fear, as well as some younger ones. If your practice involves much extraction the separate exit and entrance will be advisable, for the patient following such treatment is not the best sight for an inspiration.

If the entrance and exit are through the reception room, care should be taken to give plenty of passage space through it without circuitous routes around chairs and tables. This saves confusion, prevents undue wear on carpets and furniture and may prevent accident.

Finally, remember that you live in your office the greater part of the day—make it attractive as well as clean and it will surely be an inspiration to better work as well as a means to a better income.

The boast of heraldry, the pomp of power,
And all that beauty, all that wealth e'er gave,
Await alike the inevitable hour:
The paths of glory lead but to the grave.
—*Thomas Gray.*

For just experience tells in every soil
That those who think must govern those who toil.

THE CONDUCT OF THE OPERATING ROOM*

BY HARRIS R. C. WILSON, D.D.S., CLEVELAND, OHIO

THERE IS AN UNLIMITED AMOUNT that could, with profit, be discussed relative to this side of the evening's subject.

We have decided to make a few suggestions, points that appeal especially to the writer.

There are two persons to consider, viz., the patient and the operator. The patient is first and we will further analyze the patient's side of the subject.

1. One of the most important points is the mental effect upon the patient entering the operating room. To produce the proper mental condition in the mind of the patient, the room should be harmonious in color and cheerful; a gray-green wall with white woodwork is good and with plenty of light makes a pleasing combination and a restful one. The furniture should be simple but good. The pictures should not present scenes of horror such as sixteenth-century extraction pictures, or death-bed scenes; on the contrary the pictures should be other than dental or medical subjects.

2. The dental chair should be made to appear as clean as possible; I say appear clean; by this I mean we should use white cloth chair covers and not a brown cover, for no matter how clean the dark cover may be the white cover shows to the *patient* that it *is* clean, a distinct advantage. The cuspidor must appear to the patient to be clean; therefore, clear glass of simple construction is preferable. Likewise the operating table should have very little upon it and that distinctly fresh and clean.

3. To most patients the dental engine is the emblem of torture; therefore, why should we hang it above the nervous, frightened patients on a traveling crane for them to steadily gaze upon and develop all the fear thought possible? Common sense dictates that we put the engine out of sight absolutely.

4. A neatly-dressed assistant should be in the room and the operator, well groomed in clean linen, with a pleasant smile and a cheerful word of greeting will complete the background for obtaining the desired condition of the patient's mind.

The greatest object of the light cheerful room with all parts markedly clean and the absence of fear-producing instruments is to so fill the patient's mind with agreeable thoughts that there is no room for fear.

We will now assume that the patient is in the proper mental condition; now we must so conduct affairs as to keep him in that condition, in other words, look to the patient's comfort.

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*One of a symposium of papers read before the Cleveland Dental Society, 1914.

The proper adjustment of the chair, especially the head rest, will add greatly to the ease of the operation. The saliva tube should be used with an explanation of its function; if the patient has never used the tube, occasionally some one will think you are giving them an anesthetic through the tube.

In my practice I try to make appointments of from forty minutes to one hour and twenty minutes, according to the patient's physical endurance. Two moderate appointments are much to be preferred to one very long sitting. Patients sometimes wish to spend an entire day in the office; this should not be permitted as it so tires them that they have a lasting dread of the dental office.

A discussion of pain-relieving methods is not in order tonight, but each operator learns what gives him the best results and whatever it may be I believe we should use it and cause as little pain as possible. One method that needs more use is that of preventing *fear* of pain.

When the patient sees the engine coming down upon him he tenses his nerves until he truly suffers before the bur touches the tooth. This kind of pain is entirely unnecessary and I believe is the greater part of the pain suffered. As before stated, the engine should be entirely out of sight and brought quietly into use, out of sight, so that the first the patient knows of the engine is the grinding noise, not pain, of a sharp bur in a steady hand well braced that there may be no motion of the bur other than the revolving and progress of the instrument. So much for the patient's comfort.

Let me emphasize one point for the benefit of the patient. Cleanliness covers it all. Every instrument and article *handled* by the *operator* must be efficiently cleaned before being used for another patient.

The engine hand piece long troubled me but its solution is easy; have two sheaths and boil one while using the other.

In root canal work, especially must we be careful to have every detail of our work sterile. By the use of boiling water, alcohol and formalin, we can accomplish the desired results.

In my introduction I divided the subject into two parts: the patient and the operator.

The consideration of the operator is perhaps more important than that of the patient for the operator may spend eight hours a day in his office for forty years at close, confining work.

In view of this he must give attention to the ventilation of his room and prevent overheating. Light is most important and should be given careful attention in selecting a location.

All instruments should be perfectly classified and each should have a definite place. Of all instruments that are used in the usual operations there should be duplicates that a clean instrument may be ever ready. For the operator's benefit the patient's mouth should be brought to a position that will leave fourteen inches between the work and the operator's eyes.

The operating table should be so constructed or adjusted that it is fourteen inches from the operator's eyes—this simply to avoid the muscular eye strain of constantly changing focus which I believe to be the cause of some headaches.

The matter of keeping up a running fire of conversation with the patient is one worthy of attention. In analgesic work with N_2O it is probably desirable, but in all other work an atmosphere of quiet is much to be preferred. The whole office should be quiet. It may, with some patients, be necessary to constantly verbally suggest to them that they relax a little more, assuring them that there is little likelihood of pain and that if there is to be pain you will tell them before. However, the less we say about pain and the more quiet we can be the better for the patient's nerves. In asking your assistant for instruments, etc., the fewer words the better; often a glance or a nod of the head is better than a word.

A firm steady hand with gentle but sure touch is reassuring to a patient especially if he be nervous. The *operator* must not be nervous for his very close contact with the patient will impart that unrest to the patient. At the same time the operator who is cool and collected will impart confidence to the patient, and I believe, so quiet some patients that really painful work may be done with little annoyance.

I believe that most of the analgesia with nitrous oxid is due to suggestion—not all, I say, but much.

Suggestion, the most subtle suggestion, is not by words but by the atmosphere created by the surroundings and the individuals nearest the recipient of the suggestion.

The operator must dominate; if he permits a nervous patient to make him nervous he will fail with that patient. We must learn to so control ourselves that we always dominate and overcome the nervous condition of the patient. This requires that the operator be in the best physical condition possible.

Another point to consider is increased efficiency. A woman assistant, well trained, can save an operator much time and also make the operation of less duration for the patient, therefore easier.

Increased efficiency, the slogan of today, will mean a better satisfied clientele and more dollars in the pockets of the dentist, but Dr. Kenyon will take up that phase in a few minutes.

The conduct of the operating room may be summed up in these words: Cheerfulness, asepsis, an atmosphere of confidence with an absence of surgical or hospital suggestions to place the patient in proper mental condition.

Comfort, asepsis, quiet and pain-relieving methods to maintain the proper mental condition.

Lastly, to dismiss the patient with his mouth in the most sanitary condition that circumstances will permit, and above all, with no *fear* of his next appointment.

DISCUSSION

Dr. J. W. McDill: Dr. Wilson has summed up in a short, concise and concentrated manner, the essentials for a well-appointed, and effectively-managed operating room—in fact the detail is so well taken care of that little remains to be said, for or against.

In the presentation of these papers and the discussions in this particular symposium, we must not lose sight of the fact that the views and ideas of the *individuals* are here set forth.

Neither is it expected by any of us that all of these suggestions will be followed to the letter, for our society has reached a state much too cosmopolitan for that.

Some one has said our future depends upon three things: Birth, Education and Environment, and around these three essential fundamentals revolves the conduct of the operating room.

Because of these three conditions entering into one's life, it is as much of an impossibility for all of us to reach the same plane, as it would be for us to give an intelligent discourse on harmony, from the standpoint of the trained musician, or to try and describe the detail in a fine painting from the standpoint of the artist.

Presumably, "The Conduct of the Operating Room," is an intermediate step between the Reception Room and the Business Side of Dentistry. The door to the one leads to the door of the other and that door is *Success,* but whosoever attempts to pass through the door of success will find it labeled in large letters—"*Push!*"

Dr. Wilson lays great stress upon the mental condition of the patient prior, I take it, to the first operation. Next to one's personality, an air of success in the furnishings and equipment of the operating room, not necessarily extravagantly furnished, is a decided advantage in creating a favorable mental condition.

It is quite impossible to lay down a set of hard and fast rules, because one must take into consideration his own locality. A light cheery room seems almost a necessity from both the standpoint of the patient and the operator and especially for the latter, who spends the greater part of his life between these four walls. The acknowledged preference seems to be for a north light, although I can see no objection to either a southeast or southwest exposure in this particular locality and climate, so affected with smoke, fog and cloudy weather during certain months of the year.

I must commend him for his taste in eliminating grotesque scenes of extraction and all pictures pertaining to dental and medical subjects.

I should like to place in the eliminating class the "57 varieties" of calendars hung promiscuously about and also such placards as "Smile," "Do It Now," "This Is My Busy Day," "Tell Your Troubles to the Policeman," "It's a Cinch," "I Should Worry," "This Office Is Closed on Saturday Afternoon," "Terms Strictly Cash" followed by the contradictory placard of "Statements Rendered the First of Each Month, Settlement Expected by the 10th Unless Otherwise Arranged For."

The color scheme as worked out by a leading manufacturer will act as quite a sedative treatment, but under no conditions should the windows be curtained as they recommend, thereby removing much light, an asset of absolute necessity in the conduct of the operating room and for the comfort of the operator.

Where circumstances will permit, as much of the laboratory equipment as possible should be removed from the operating room, it being next to impossible to confine within a small area the odors of vulcanization and the litter incident to plaster debris.

Many men, mechanically inclined, over-indulge this taste at the expense of a neat, orderly, tasty, operating room, and as a consequence that part of the office which should be the most quiet, restful and soothing has attained machine shop proclivity. For those using a large amount of electrical apparatus, a switch board seems almost a necessity with the wires concealed as much as possible.

If the dental engine suspended on a "traveling crane" is a near cause for hysterics, the network of wires about many of our chairs must lead some patients to feel they are about to be seated in the executioner's chair, and I have no doubt many silent prayers of thanksgiving are offered up on completion of the operation without a catastrophe.

I dare say 75 per cent. of our patients are ladies, and to the majority of these the odor of tobacco is offensive; it is, therefore, quite incumbent upon those who revel in "the weed" to remove, in so far as possible, all trace of odor so common to smokers, and under no circumstances should this pleasure be indulged in in the operating room where it might be particularly obnoxious to a fastidious patient.

The essayist emphasizes the necessity of quiet, and for that reason singing birds, music of all kinds, noisy toys for the children, should be entirely eliminated, for while they may be pleasing to some, they may have a very depressing effect on others.

The condition of the furniture, chair, cabinet, bracket, cuspidor, linen, etc., has been well covered and needs no mention here. My efforts have simply been to enumerate some things which seem to have been omitted in the paper.

After all is said and done, "the conduct of the operating room" is simply a matter of *taste* in the individual.

BUSINESS METHODS IN DENTISTRY*

BY H. C. KENYON, D.D.S., CLEVELAND, OHIO

IN THE SHORT TIME ALLOTTED me it will be impossible to more than touch upon a few of the important features of the so-called business part of a dental practice.

This is a very large and a very important subject to every practitioner of dentistry, young or old. My remarks are to be addressed to the younger men with the hope that some, at least, may be warned and steer clear of some common pitfalls on the road to financial success in their professional careers.

It is just as essential that the dentist should be proficient in the business side of his calling as in the purely professional part of his work. No man can attain his maximum professional efficiency if he allows the business side of his work to worry him, and as it will surely do so unless properly handled, he should arrange to care for this part of his occupation in a dignified, definite, concise and systematic manner.

Right here let me say that while some men may seem to attain a certain enviable financial or business success through questionable methods and by taking advantage of the necessary ignorance of many patients as to the nature and value of the services rendered, it is my opinion that an equal amount of energy applied to strictly honorable business practices may be made to be more remunerative in the professional life of any practitioner.

Every man in the beginning of his career looks forward with hope and more or less impatience to the time when he can charge a big fee and get away with it.

---

*One of a symposium of papers read before the Cleveland Dental Society, 1914.

If you wish to collect a large fee for your services you must be strictly honest; honest with your patient, with yourself and your family, and with your professional brother.

Now, in my opinion, one cannot be strictly honest and deal "on the square" with his patients unless he has some system about his business and method of making his charge.

To be honest with your patient you must render *value* for *value* and you must *know* that you are doing it and, if asked, be able to show *clearly* to the patient that you are giving value for value without any subterfuge or beating around the subject. Any hesitating on your part at such a time is very convincing evidence to the patient that you just charged the fee in question because you thought he would "stand for it" without necessarily much regard for the real value of the service rendered Your own honest satisfaction that the fee is a proper one is 90 per cent. of the explanation in your favor. He senses your sincerity immediately and is easily convinced of the fairness of your charge. Incidentally the dentist who guesses at what the size of his fees should be, *more often cheats himself* than his patient and has more trouble in collecting what he does receive. To be honest with himself, his family and his brother practitioner one must assess a fee that is commensurate with the service rendered, and it is simply impossible for the average man to do this while guessing at the fee.

Then how shall we arrive at a proper fee for a given service? That is a subject so large that several essays the length of this one would not exhaust the subject, but I may briefly suggest the following as fundamental factors in determining the fee:

The time consumed in performing an operation; the value of the service to the patient; the skill required to perform it; the risk to the life or health of the patient, or in other words the responsibility assumed by the operator; the cost of materials, etc., that may be used; and finally, when all other factors have been considered, the resources of the patient, or his ability to pay the fee; for I suppose that the time will never arrive when it will not be considered the duty of the professional gentlemen to give of his skill and ability to serve, to such of suffering humanity as present themselves to him for such a fee as may be within the reach of their resources. But in average cases the amount of time consumed is the best and fairest guide to the proper fee, because it is an accepted rule that each should pay according to what he receives, and it is assumed that the amount of service rendered corresponds approximately to the amount of time consumed in rendering it.

In considering the business of a dental practice it is necessary to consider *contracts*, for every time a person comes into your office and you perform a service for him there is a contract—expressed or implied—entered into between the two of you. Now, whether this contract shall be expressed or tacitly entered into depends much upon the circumstances of each individual case. In most cases it should be a clearly-expressed contract and in many cases all the details, such as amount of fees, kind of services, time of appointments, and time of payment should be clearly understood before the services commence. When, as in many cases, it is impossible to determine in advance the amount of the charges, it should be explained patiently and clearly to such as do not understand your business customs that the amount of the fees will be largely determined by the amount of time used in performing the services. It should be clearly impressed upon the patient that when he agrees to an appointment at a future date he has contracted with you for the use of that particular time, and that this time has a value which he must stand for, whether he uses the time or not, and also that if he is tardy in keeping the appointment he must expect to have all the time charged to his account. This is the one and only remedy for broken appointments. Also he should understand that if you find other occupation for the time he has failed to use and remit the charge to him that you are extending a courtesy to him. If this matter is properly presented at the right time it is a rare occasion that the justice of it is not acknowledged and respected, and in most cases where it is otherwise, the reason lies in the fact that the patient has not realized that he had actually entered into a contract with you and that you suffer a real loss from his failure to keep the appointment.

APPOINTMENT CARD

H. C. KENYON, D.D.S.

730 Rose Building

.... has

engaged the time of DR. KENYON at.......o'clock Standard

....

KINDLY OBSERVE

This time is reserved exclusively for you. Please give twenty-four hours' notice if you cannot keep the appointment, otherwise time will be charged on your account at $4 the hour.

Payment will be required promptly upon the presentation of each *monthly* statement unless other arrangement has been agreed upon *before services have been rendered.*

Appointment Card.—This card is given to each patient for each appointment. No dispute can then arise as to the day or the hour of the appointment, or as to the terms of their contract.

Now, I suppose some one will ask, "Do you go to all that bother with every patient?" I expect every patient, or the party who will be responsible for the fees, to have a clear understanding of the contract before work progresses beyond the second appointment, and with the proper equipment of office stationery, cards, etc., there is no "bother" connected with it—at least not half so much bother as to have even one case each month in which a misunderstanding occurs *after* the services are completed.

MONTHLY STATEMENT

Cleveland, Ohio........................

....

....

TO H. C. KENYON, D.D.S. DR.
730 Rose Building

For Professional Services.................. $...........
Cr. on Account............ $...........
Cr. on Account............ $...........
Balance due .... $...........
Received Payment ....
Bell Telephone ....

Statements are mailed on the last day of each month for services rendered within the month. Unless other arrangement has been agreed upon before operations are commenced, payment is expected promptly upon presentation of each statement.

A complete record of all operations is kept for reference. If there is anything not understood regarding either the fees or the services you will confer a favor if you will call at the office and ask for an explanation

FOLLOW-UP CARD

Bell Telephone H. C. KENYON, D.D.S.

730 Rose Building
East Ninth Street and Prospect Avenue

CLEVELAND, OHIO

This is to advise you that it is time for another inspection of your teeth. Your last dental services were completed..............

Appointments should be arranged in advance and may be made by phone or mail.

REVERSE SIDE OF FOLLOW-UP CARD

AN UNHYGIENIC MOUTH MEANS DISEASED GUMS AND TEETH, FAULTY MASTICATION, IMPERFECT DIGESTION, INSUFFICIENT NUTRITION AND LOST HEALTH. CLEAN TEETH DO NOT DECAY.

Follow-Up Card.—This card is mailed at such intervals as the condition of the mouth indicates will be necessary in each case Some as often as every two months, mostly once in six months. This prevents many patients neglecting their mouths.

An efficient system of records and bookkeeping should be installed in every dental office. These may be as elaborate as the proprietor wishes or they may be very simple. But however simple in form, they must include a record of all charges and credits on each account, and a complete and definite record of all services rendered in each case, and the amount of time consumed in these services, whether at the chair or the bench or supply house.

An important part of the business of a dental practice is the matter of collections. People now-a-days expect to have bills collected from them, and do not usually make payment until they receive a statement unless there be some specified time that they understand is the time payment will be expected. One should, therefore, have some regular plan of collections and acquaint his patients with his custom before services are undertaken. What this plan shall be will depend, as should all other business methods employed, somewhat upon the clientele one has. In the matter of the time and manner of payment one will usually have to vary his practice more than in any other business procedure within his office. There is one hoary custom, however, that has been and still seems to be very much in vogue which has nothing in it worthy of commendation, and that is the habit of some of proceeding to work for any or all who come with no arrangement whatever as to pay, either as to amount or time, and then expect to collect at the completion of work. This is exceedingly poor business procedure, and no business man would tolerate it for a single month. Many times such cases will string out over five or six or more months. This practice is permissible and even desirable with selected patients if the matter of interest is considered in assessing the fees, but in the average case it is in every way more satisfactoy to *both* the patients and the dentist to have more frequent periods for collections. There may be a number of good plans covering this subject but the writer believes that the custom of monhtly collections is far ahead of any other for the average clientele. It has the advantage of being the common custom of all business houses that do a credit business and the people are therefore used to it. Also it has the effect of bringing in a monthly income to meet the monthly expense account. It also divides up the cost of the services more conveniently for those of limited means and it protects the dentist from wholesale fraud on the part of those who are dishonest. For any dentist who will go on working for a patient in the second month when the first month's bill is unpaid is an easy mark and deserves to get stung.

The handling of delinquent accounts should be discussed in this connection, but the essay is already too long and I will omit this part of the subject. However, with a thorough application of business methods to the business of a dental practice, there should be so few delinquent accounts that the subject should hardly need mentioning.

The Forty-ninth Annual Meeting of the Ohio State Dental Society will convene in Columbus, December 1st, continuing through the 2d and 3d. Papers on live subjects by able men on Tuesday and Wednesday afternoon; clinics Wednesday and Thursday forenoons.

EDITORIAL

Five Blunt Statements, Five Pertinent Questions and One "Thinkover"

1. Cost of living has materially increased.

2. The reputation of being a high-priced dentist is better than the reputation of being a low-priced one. The reputation of being higher priced than a competitor is better than the reputation of being lower priced or of having the same price. It indicates greater skill—better work—and attracts a class of patients who are willing to pay fair fees.

3. Every man is entitled to fair returns for his education, his skill, his labor and his investment.

4. No man will pay $10.00 for work when but $5.00 is asked. Most men will willingly pay $10.00 when $5.00 might have been asked. Most men think more of a $10.00 operation than a $5.00 one, and think more of the man who charged it, too.

5. The need of most dentists today is more nerve; nerve to charge sufficient for their skill—to give themselves and their families enough to live *well* and leave some for the *bank.*

Questions.

1. Without getting personal, what is your competitor and what progress is he making?

2. Is he a splitter of half-dollars, of dollars, of half-eagles or of eagles, in his charges?

3. Is he any further ahead financially than he was five years ago, now that he has five fewer years to live?

4. With the butcher, the baker, the candlestick maker charging more for their wares, is he holding his "I can't" oars in his limp hands and floating?

5. Where's his nerve?

"Think Over."

1. You and you only are the architect of your fortune.

Time

To keep just track of where I go
Entails vast thought and pains:
Who follows close, the secret learns
And thus his increase gains.

SOCIETY·ANNOUNCEMENTS

The International Dental Congress

By a Visitor

The Sixth International Dental Congress will, for more reasons than one, be well remembered by those who attended it.

The Western world is growing expert in the organizing and steering of these gigantic special committees, nor was the meeting which took place a month ago in any way behind kindred gatherings in these respects. The wayfaring foreigner or visitor was ably and unobtrusively steered from beginning to end of his adventure, both in the Westminster Hall and amidst the mazes of the South Kensington College. He could, it is true, if he wished, once having safely reached the gracious grey-roofed building with its stonework toned softly down to the characteristic London mezzotint, find his own way, enjoying the agreeable sense of personal enterprise, to and from the remotest of any one of the nine sequestered sections, the spacious Demonstration Room—with its attractive little bird's-eye gallery, the magnificent museum, the exhibits and the luncheon-room—with perfect ease, or he could hand himself over and obtain guidance and every kind of information, *renseignements, nachrichten*. . . .

The first half-hour of the second day was distracted, unless he had made his decision in advance, by the embarrassment of choosing one amongst the nine complementary sections. We saw people hurrying from side to side of the roadway, up and down stairways and along corridors, groups standing about in visible inability to commit themselves, friends separating to go their different ways, families torn apart by conflicting interests, until at last, audiences had grouped themselves, the sections were at work and peace settled down upon the passage-ways to be broken only by the occasional hurrying footsteps of those who wandered undecided from charm to charm and by the valiant efforts of messenger boys to induce speakers or readers of papers to be present in two or more sections at the same moment.

The breakdown of the program, owing to the absence of the greater number of the Continental contributors, entirely extinguishing at least one section and robbing the remainder of much valuable material, introduced an uncertainty that was not altogether without its compensations. Resources were drawn upon. There were unrehearsed effects. Several interesting informal discussions were added to that part of the program which survived the wreckage. The syllabus is an eloquent testimony to the scope of modern dentistry on its analytical side and also to the growth of the synthetic movement, the increasing clarity of dental theory in its explanatory and preventive aspects. These facts will come home to the dental world at large when the Transactions, which will include the unread papers as well as those which were delivered, are in our hands. Let us hope that all those, both at home and abroad who were unable to attend the Congress, will be at liberty to benefit by it when it reaches its ''armchair'' stage. The social side of things, with its stimulating, vitalizing uses, was necessarily in abeyance. Most of the social arrangements were cancelled; the proceedings were at an end at the close of the third afternoon. The Congress as a whole will be remembered, as are all distinctive events, by the force of its own individuality, and on this occasion the more indelibly because, for the majority of those present, it was thrown into strong relief by an unbounded pre-occupation. Outside, the everyday proportions of things were being thrown into confusion. Within the quiet wall, part of the most recent chapter of the history of the cosmopolis of science was being serenely published.—*The Dental Record.*

Northern Indiana Dental Society

In spite of the pouring rain that did its best to spoil things the first day of the twenty-sixth annual convention of the Northern Indiana Dental Society, at Culver, August 28-29, the meeting was a notable one, full of interest and enjoyment to all who attended.

Papers by Drs. Jackman, Crandall and McKesson are regarded by all who heard them as real contributions to dental literature, while the discussions that followed were unusually intelligent and brought out many important points.

The session was followed by a horseback ride, for which the horses of the Black Troop were courteously tendered by the authorities of the Culver Military School; single and crew boat races, and a ball at the Lake View hotel Saturday evening.

All of the papers and discussions will appear in THE DENTAL SUMMARY in due time.

The next meeting will be held at Bluffton, the date to be decided upon and announced later.

There are a lot of royal good fellows in the Northern Indiana, and it is to be regretted that there are not offices enough to go all the way 'round; the following were chosen for the coming year:

President, W. LeRoy Myer, Rensselaer; vice president, O. A. VanKirk, Kendallville; secretary, F. A. Wildason, Eaton; treasurer, Charles Priest, Marion; supervisor of clinics, L. W. Dailey, Bluffton.

Indiana State Board of Dental Examiners

The next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, commencing Monday, November 16th, and continuing five days. For application blanks and full particulars, address DR. FRED J. PROW, *Sec'y.*,

Bloomington, Ind.

Michigan State Board of Dental Examiners

The semiannual meeting of the Michigan State Board of Dental Examiners will be held in the Dental College at Ann Arbor, commencing Monday, November 9th, and continuing through the 14th. For full particulars and application blanks, address F. E. SHARP, *Secretary,*
Port Huron, Mich.

Michigan Licentiates, Please Notice

The licenses of all Michigan licentiates, whether practicing in the state or not, who have not paid their annual registration fee, will be revoked at the next regular meeting of the board, which will be held in Ann Arbor, November 9th to 14th. F. E. SHARP, *Secretary,*
Port Huron, Mich.

Wisconsin State Board of Dental Examiners

The Wisconsin State Board of Dental Examiners will convene in Milwaukee at Marquette University on December 14, 1914, at 10 A.M., for examination of applicants to practice in Wisconsin.

High school diploma, application and $25.00 fee to be filed with the secretary ten days prior to above date.

Dental diploma to be presented in advance of the examination.

Junior dental students presenting a clear card for two years' unconditional work from a reputable dental college and filing a high school diploma, or its full equivalent, will be permitted to participate in the theory examination in the following six major subjects: Anatomy, Physiology, Histology, Chemistry, Bacteriology, Materia Medica. The grades made in these subjects will be credited at subsequent examinations.

Special application blanks for this examination and $10.00 fee, together with high school credits, to be filed ten days in advance.

S. H. CHASE, *Pres.,*
1404 Majestic Bldg., Milwaukee, Wis. W. T. HARDY, *Sec'y.,*

IN MEMORIAM

THOMAS L. RILEY

SECRETARY OF THE CLEVELAND DENTAL MFG. CO.

DIED ON THURSDAY, SEPTEMBER SEVENTEENTH
ONE THOUSAND NINE HUNDRED AND FOURTEEN
IN HIS FIFTY-FIRST YEAR

INTERMENT AT CLEVELAND, OHIO

NEWS and OPINIONS

CONDUCTED BY G. E. HARTER

What Is Doing In the Societies

The Toledo Society

The Toledo Dental Society opened the year's work with a social session at the Commerce Club, Friday evening, September 11th. The officers for the year are: President, D. A. Elwell; vice president, J. W. Travis; corresponding secretary, W. S. Sargeant; recording secretary, T. S. Shaw; treasurer, I. A. Eppstein. The program committee has prepared an interesting year's work, taking up subjects that are at the present time commanding the thought and attention of the profession: X-ray work in Dental Diagnosis; Interstitial Gingivitis; Septic Poisoning from Diseased Conditions of the Oral Cavity; Root Canal Treatments, etc. One entire day was given over to Operative and Table Clinics.

The society is in a flourishing condition and is growing in membership. The younger men are coming with us and the prospects look bright for a great future.

Free Dental Dispensary in Toledo Public Schools

The Toledo Dental Society has been conducting a dental clinic at the District Nurse Dispensary for the past four years, being supported by the Dental Society and the District Nurse Association. Thousands of children have been relieved of their tooth troubles and instructed in regard to the care of the teeth and mouth.

The school board at its last meeting approved the plan of taking over the clinic and placing it in one of the centrally located ward buildings. The board agrees to maintain it, furnishing materials and pay for a dental man to devote half-time during school term.

This is the result that the Dental Society has long hoped and worked for, and now that it has been realized, the future success of the dental clinic and oral hygiene movement in our schools is assured.

Dental inspection will continue to be made by the medical inspectors, which furnishes ample material to keep the clinic busy. The next advance step will be to show the necessity for a dental inspector and dental nurse to devote their full time to school work.

The wheels of progress grind slowly but sure.

The West Virginia State

Huntington, Aug. 15.—Before adjournment the West Virginia State Dental Society Thursday elected officers as follows: President, W. B. Conoway, Clarksburg; first vice president, Homer Mannon, Huntington; second vice president, J. S. Stone, Clarksburg; secretary, Dr. Parsons, Huntington; treasurer, C. C. Clark, Blacksville.

Eighth Michigan District

Saginaw, Aug. 18.—The Eighth District Dental Society held their annual outing at Wenona Beach Saturday. The day's program included games, a genuine, old-fashioned talkfest and a boat ride on the bay. A banquet took place at 6 o'clock at Wright's cafe. At this bounteous repast appropriate toasts were cheerfully rendered. The following Saginaw dentists were in attendance: Drs. Myers, Snow, Faucher, Goodsell, Stone, Welsh and Purmort.

''The Ohio Idea'' is catching on in other states. Dr. H. C. Brown, formerly president of the National Dental Society, writes that the states of Michigan, Georgia, Virginia, New Jersey and Oklahoma are organized on the Ohio plan and are also trying to secure the appointment of a dentist on their State Boards of Health. It will be remembered that Gov. Cox was the first governor in the United States to recognize the dental profession to the extent of such an appointment.

Sounds Extreme

Bill—I see St. Louis schools are to have a dental clinic with volunteer dentists.

Jill—For the love of Laughing Gas! I thought the schools were doing away with all forms of extreme punishment.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXIV NOVEMBER, 1914 No. 11

OFFICIAL ORGAN

The Ohio State Dental Society
The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

PULP CANAL OPERATIONS.*

BY ELMER S. BEST, D.D.S., MINNEAPOLIS, MINN.

I CANNOT SAY that the presentation of this paper gives me unalloyed pleasure, for while it is true that to improve we must intelligently comprehend our shortcomings and failures, yet, to my mind, parading them as we do now resembles an assembling of the family skeletons, and one naturally shrinks from the duty.

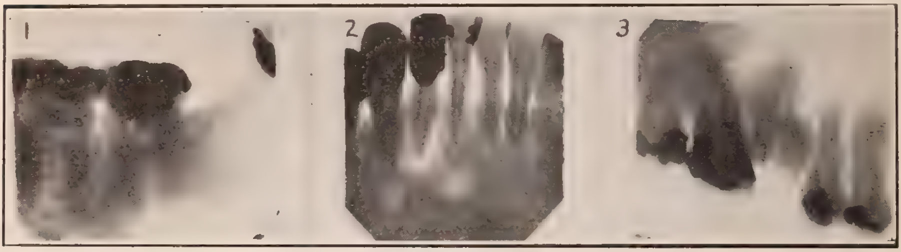
Before the time I became deeply interested in this subject I believed that whenever one wished to dispose of a superabundance of ideas without subjecting himself to adverse criticism, he would select the topic of "Pulp Canal Operations." I always thought this field comparatively safe for anyone to exploit his pet ideas, whether practical or otherwise, for who was to know aught as to their successful or non-successful application?

---

*Read before the Northern Ohio Dental Society, 1914.

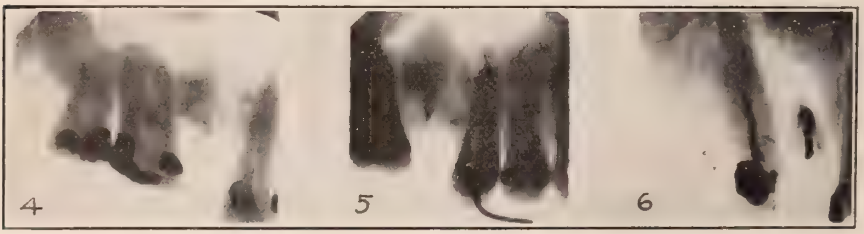
In consequence, we have on record in excess of one hundred methods of doing this work. (Please note here, however, that I have no desire to cast aspersion upon any ideas ever advocated when their application has done the least to solve this problem.) But late events have changed my mind. It is now a dangerous subject.

With the coming into more common use of the radiograph as an aid in these operations, we have seen formerly accepted theories rapidly disappearing, to be replaced by those adaptable to modern and improved ideas.



No. 1. Shows abscess around apices of lower second molar.
No. 2. Case referred for radiograph. Shows diseased areas around apices of three teeth.
No. 3. Shows roots of first molar causing necroses extending from second molar to first bicuspid.

To the men who have emphasized the importance of clean pulp canal operations and drawn our attention to the evils attending the work improperly done, we must give great praise. Through their teachings many of us have greatly improved our technic. Though the operation is a comparatively old one, there is an unsettled question in my mind as to whether patients were not much better off without natural teeth as composing the masticatory apparatus than to have them resting upon diseased areas such as we frequently find.

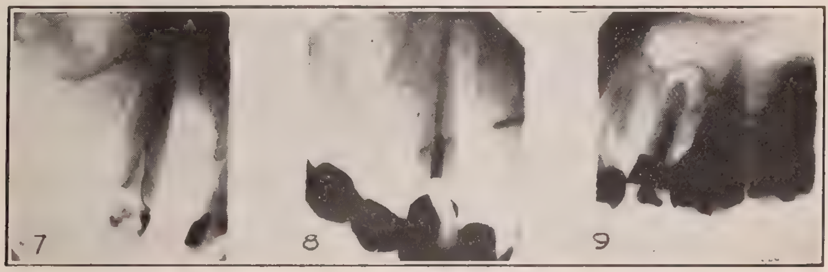


No. 4. Same as No. 3. Buccal roots removed and lingual root lying close to second molar.
No. 5. Shows broach passing through second bicuspid into antrum.
No. 6. Shows poor root canal filling in cuspid and infected area surrounding small piece of lateral root.

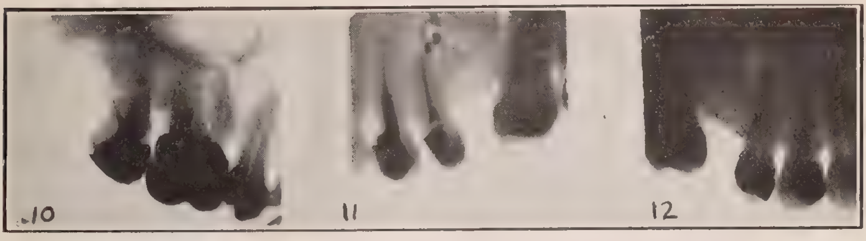
From this point on, my remarks will not apply to those who are doing good pulp canal operations but to those who are responsible for the 90 per cent. of defective operations.

For the inferiority of the defective work shown, I have no condemnation, for I confidently believe that this work was done in ignorance of existing conditions. The operators knew not what they did. I believe, gentlemen, that a policy based upon condemnation is not an educative one. Rather let each one of us make it our business to know the exact nature of our operations, where our failures are and why we fail.

Doubtless many here tonight are surprised to learn that in reality ninety per cent. of these operations are defective. These figures are based upon the observations of men whose policy is to be accurately informed and whose statements cannot be refuted. Let none of us console ourselves with the thought that in belonging to the ninety per cent. we are in any sense secure because of the fact that somtimes in numbers there may be strength, but let us rather think that while we are being recognized as a learned profession, the very foundation of much of our work is only ten per cent. efficient, and what will the outcome be when these facts are common property among the medical fraternity?



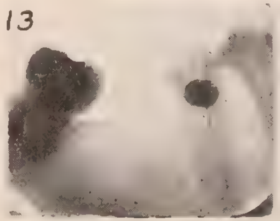
No. 7. Same as No. 6. Shows wire in root showing canal opened.
No. 8. Same as Nos. 6 and 7. Showing canal filled to apex.
No. 9. Shows carious area surrounding second bicuspid.

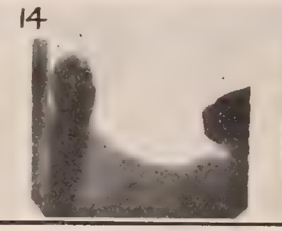


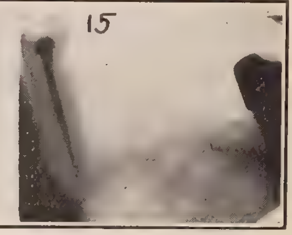
No. 10. Shows carious area over mesio buccal root of first molar.
No. 11. Shows roots of first and second bicuspid. Area over second bicuspid shows bismuth paste.
No. 12. Area of infection over second bicuspid.

We have been assailed by the members of the medical profession in a general way in the past on account of septic work and will be assailed in the future, when our position will be untenable if they can present radiographic findings showing as high a percentage of unskilled pulp canal operations as formerly. The problem of placing this operation on a scientific basis and the making of its accomplishment possible by all is one which will be solved, I believe, in the near future, though there are many obstacles to be overcome. We must be cautious about making promises but I will risk this statement, "That the outcome of our laboratory experiments looks very promising."

Now just what is our position in this matter? These patients place their cases in our hands. If we are worthy of the name of professional gentlemen we will discharge faithfully our obligations, and not by taking a decidedly unfair advantage of their innocence foist upon them an operation which we can only allow to remain by basely deceiving ourselves.

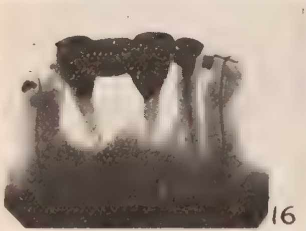


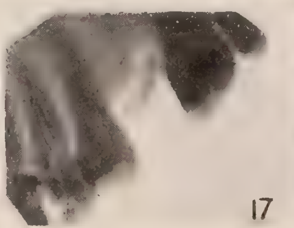


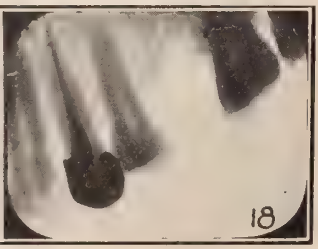


No. 13. Wire in lower bicuspid measuring distance root canal is opened. It will be seen that canal is not opened to apex.
No. 14. Wire in root canal.
No. 15. Bicuspid with root filling.

I have found that many practitioners seem to feel that the idea uppermost in the minds of their patients is what fee they will be expected to pay, and not what quality of service they are going to receive. Whenever this idea in reality exists, I believe it is distinctly the fault of the members of our profession. Who has educated these people to this standard of reasoning? Certainly they were not born with this idea. Therefore, our duty is obvious. When we are about to perform an operation of this nature we should learn the patients' attitude towards the work. If they have been sufficiently educated and are looking for quality of services, all well and good, but in case they are in need of educating, now is the time to do it. You cannot do it when the operation is completed.



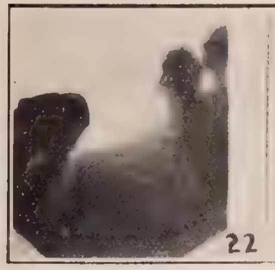


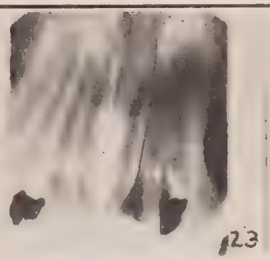


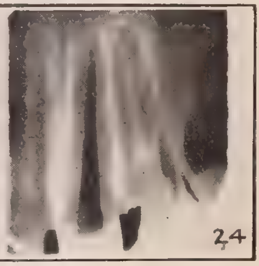
No. 16. Wires in lower cuspids. Also examining for bony support of central and lateral to be included in new bridge. Were extracted.
No. 17. Wires in upper cuspid.
No. 18. Same as No. 17. Roots filled.

Work such as we have seen tonight, and we have all furnished our quota of such operations in the past, as to compensation, is generally founded upon a time limit. We all know how it occurs. The operations are based on certain forms of technic, the applications of which are worse than faulty. Just as long as the belief prevails that all pulp canals can have their contents removed and then be filled in a perfunctory manner, just so long will we continue to have septic root canal operations. Almost every time this subject is presented for discussion there seems to be a contest to see who will be the first to present that conscience-easing argument that our patients will not pay for the better operations. After close inquiry into a great many cases, I want to caution my hearers to be careful in making such an assertion. When you have explained to the patients from radiographs, or enlarged prints of radiographs, the conditions that prevail under this work improperly done, and that the cause for much of it has been that dentists felt they had reason for believing their patients would not be willing to pay for better work, also that the expenditure of time or money upon the crown of the tooth is so much loss if the operations upon the root have not been well done, but on the other hand have showed them radiographs which demonstrate the fact that you can do intelligent and clean operations, then, gentlemen, and only then, say that patients demand such operations as they have been credited with. When we are honest with one another and with ourselves individually, we admit that the cause for the trouble is not where we have for years placed it, but lies right with the operator. I no longer believe there is

No. 19. Wires in first and second bicuspid and first molar.
No. 20. Lower cuspid filled.
No. 21. Bicuspid with wire in place.

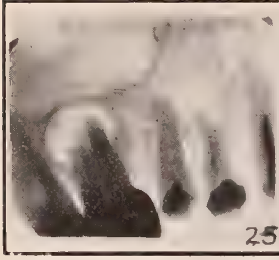


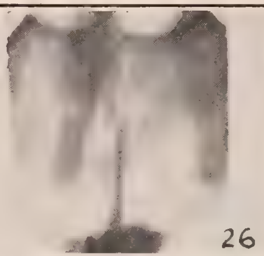


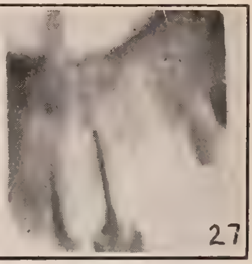


No. 22. Same as No. 21. Root filled.
No. 23. Measurement wire in central.
No. 24. Same as No. 23. Root filled.

any honest reason for these defective operations. Many men will say, "But I have no trouble from my root canal fillings." Let me quote from an editorial in *Items of Interest*, by Doctor Ottolengui:







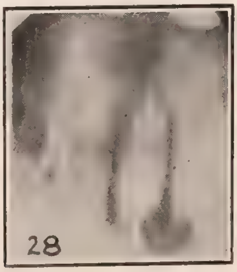
No. 25. Referred for radiograph. Carious areas over first molar, first bicuspid and cuspid.

No. 26. Shows right upper central with root filled and left central with putrescent pulp with slight indication of infection.

No. 27. Shows root canal filling in left central not reaching apex.

> "Perhaps the strongest argument offered is that teeth thus treated give no trouble thereafter. This question of the 'trouble' that follows the imperfect, or unscientific, or non-aseptic treatment of pulp canals is the most serious problem now confronting the dental world. Usually a statement of this kind has a very circumscribed meaning. If the tooth treated gives no pain, if it does not become sore upon percussion, if it does not develop an active alveolar abscess; in short, if it is retained in the masticatory apparatus as a painless unit, the dentist counts that it is giving 'no trouble.' But we are learning that these teeth which may not seem to be giving trouble may really be working havoc for the patient. Radiography has discovered literally thousands of these non-troublesome teeth, afflicted with septic areas about their apices, serving as sources of infection and causing distant systemic disorders of the most painful and often dangerous character not infrequently terminating in death."

Some of the pictures you have seen tonight show conditions which give absolutely no manifestation in the mouth, and yet see what is happening. The operators responsible for such operations believe with the utmost sincerity that they do not have trouble with their pulp canal work. I have no hesitancy whatever in saying that when we usurp the privilege



No. 28. Shows root filling removed and root filled to end.

of our patients in determining the nature of the operation they shall have, especially when we make such an inglorious showing, we are neither honest with our patients nor with ourselves, and we are busily tearing down and tramping under our feet the highest standards of our professional duty.

The only intelligent means of educating the public along these lines is through the dental profession. So, therefore, it is their right and our duty that we shall first understand thoroughly these things and then explain to them in detail, if necessary.

My experience in examining oral conditions with the radiograph, and making all due allowances for errors in interpreting the radiograph, teaches me that the teeth that are causing trouble from defective canal work and which give manifestations are decidedly in the minority. For every tooth with a sinus there are many which are pouring their poisonous products directly into the system. So you see, gentlemen, we cannot afford to imperil our reputations or the health of our patients. We must change this operation and *instead of making it one of the minor considerations, it must be considered equal in importance with any operation which we do in the human mouth, and you know what that means.*

I contend that in the majority of the cases where the nature of the work about to be undertaken is such that root canal work is involved, its importance must be explained to the patient. The vital importance of completed root canal operations—and by completed I mean all that skill, perseverance and equipment can honestly accomplish—must be thoroughly understood and appreciated by the operator. He must know for himself the dangers that accompany faulty work and must know what it means for him to devote the necessary time to the operation as he believes it should be done. He must be thoroughly familiar with all of these things and must believe implicitly in the honesty of his operation before he explains or attempts to explain it to his patients. He must then stand "pat" and explain that this work means a certain remuneration, and that so far as he is concerned it is that method, that fee or nothing at all.

In the past ten years we have made simply marvelous strides in many fields of dental operations and to my mind some of these cases, showing almost dazzling technic, appear increasingly tragic, as they are in many cases simply beautiful houses constructed upon the sands, inasmuch as the roots supporting these structures are resting in large areas of carious bone tissue, much of which was primarily brought about by poor root canal work. I want to say in behalf of the dentists who did most of the operations I have shown tonight, that they were in a general way guided by a fairly good display of judgment, but they failed simply because they had not the means of telling the exact nature of the work they were doing. And of course not knowing where they were failing, how can we censure them for saying that they do not have any trouble with their root canal operations? Had they been able to see these operations, they would not have rested content until they were removed and properly replaced. How can any dentist tell by the appearance of the crown of the tooth, the length or shape of the roots? How can he tell when working down in a canal and the patient complains of pain whether he is through the apex, or has a fragment of vital pulp tissue to contend with? How can he tell when he meets an obstruction in the canal whether to continue would lead him to the apex via the pulp canal or if he is heading for a perforation? You had better believe that very few men can tell these things without such assistance as the radiograph gives us.

In closing this paper, let me say that the permanence of our success as a profession is based upon the purity of the operations of the rank and file, not the elect. The glory or censure alike which will be ours shall be shared by all. Dentistry of the future will occupy just the position we are willing, by our intelligent efforts, to give it.

NOTE—Technic described in explanation of clinic.

DISCUSSION.

Dr. W. A. Price: The Northern Ohio Dental Association has always been worthy of the best that the profession could afford. I think this afternoon that we have had the "Best." There are few opportunities in our lives, I think, when we can emphasize so forcibly the necessity for our counting the cost. I shall try to emphasize that part of Doctor Best's discussion which has to do with the attainment of a very high degree of perfection, and I shall presume that every man who has heard this lecture this afternoon has been impressed entirely in proportion to his own standard of the cost of failure. In other words, I shall ask you to make, for the moment, in your mind, an estimate of the cost of failure. Let us presume that you fail then to fill perfectly the canal of the root. What is the cost of that failure? The estimate of the past has been a tooth. The estimate of this hour is possibly years of suffering, possibly human life.

Now, as we take up this discussion from that standpoint, I am going to ask you to have in mind a very particular tooth in the mouth of a very particular friend, preferably some member of your own family, for there is no way that we can count cost so well as to bring it very close home. Let us presume that it is the dearest member of your family now, and you are to fail to fill perfectly that tooth root. Let me ask you now if it is not true that the effort you put on that operation is almost directly in proportion to your appreciation of a serious sacrifice, a serious cost in case of failure. If you could presume, for example, that the only injury that could come to that dear friend of yours was the use of that tooth for the rest of his lifetime, you would readily understand that with your skill, particularly since you are such a good dentist, he could have a substitute, and he would not suffer much loss, consequently the money value or cost of failure is relatively very small.

But, on the other hand, I want you for a few moments to put as the cost of failure, ten years of ill health, or a premature death by several years. Having that as your viewpoint, I am going to ask you to consider some facts: During the last twelve or twenty months there has been brought out in the splendid researches, particularly of Doctor Rosenow, of Chicago, this fundamental fact, that the organisms that we know as the streptococcus group may change from one of that series to another of that series under satisfactory environment, which means that you may have a simple hemolysing streptococcus change over to the form we know as the rheumaticus, which has the peculiar characteristic of selecting chiefly one tissue of the body, the synovial membrane of joints, or it may change over to the St. Vividans, which selects chiefly one organ, namely, the heart valves, or it may still change over to the pneumococcus, with its capsule, and, as a typical pneumococcus, may produce the grave affections of that organism; or it may change over to the mucosus, also capsulated, which attacks the stomach lining and various ducts of the body, producing not only local affections but probably gall stones, etc.

Now, if it is a fact, as seems to be established, that that organism may change from one of those forms to any other form, provided we have a satisfactory environment, will you not be more careful with the filling of that root canal for that dear friend of yours in your own family, when you realize that an infection at the apex of that root, which infection does not have to enter through that root canal, as I will explain in a moment, may bring to that dear friend any one of that chain of infections and their consequences? If you are not able to accept that yet, we only pray that you may live a few months or years, and I think it will be one of the accepted facts of modern science. It is accepted now, and I think proven to the satisfaction of many of the best laboratory scientists.

I want to emphasize another point, so that we may count the cost of failure. I inferred a moment ago that it was not necessary for that infection which might cause any of those grave lesions to enter through the canal of the root, to reach the apical area. Some of the most startling results of the last few months in the pathological and bacteriological laboratories have brought out the fact that the grippe organism, for instance, may be found in the appendix, may be found in a blind abscess, and may be found in the root of a tooth in which the pulp has died from traumatism, where there never was an exposure. Not only has that grippe organism been found, but a number of organisms have been found in a large number of cases.

To be specific, the pathologist, who has been assisting me here, and I have found in unexposed pulps, where there was no possibility of germs entering through a tooth cavity to the pulp chamber, an organism that reached that pulp chamber through the system. Week before last, in talking with one of the splendid bacteriologists in Indianapolis, he made the statement that appendical infections were very often followed by the infection of pulps that had died during a traumatism.

Do you get the significance of it, that the mere production of an area of weakness around the apex of a tooth, even though it is not infected, makes it possible and even probable that when that patient gets a severe infection, that infecion will lodge at that point?

Now, to illustrate, let us suppose that we had in this room a serious contagion of smallpox, which necessitated the sterilizing of this entire interior. You would readily see that with our washes and gases that we sterilize with, we could reach all the places that those media could reach, but if a corked bottle in this room contained some of that infection, the organism would still be kept alive. We have then, in an imperfectly filled root that is sterile, I grant you, a hiding place for germs which have invaded the system to approach and propagate and from which later to reinfect the body. The leucocytes cannot enter the root, open and destroy the organisms and thus obliterate the focus as they would an area of infection in vascular tissue.

In other words, when we fill a root imperfectly, the cost of failure is not that tooth. The cost of failure may be the life of that dear one. I want you, if you have not done so carefully, to take the last bulletin of the National Dental Association and look at the illustrations of the work done by the corps of research workers in mouth inspection, under the wisdom and direction of Doctor Hartzell, and you will see the record of a case of Adam Pohr, where there is a very conspicuous infection. The history of the case is this: The man had been in the hospital with rheumatic arthritis. The treatment as applied in the hospital did not reach the case. Skiagraphs were made. The areas of infection show at the end of the roots. The first molar was extracted and the cultures made, but not the organism that would be expected to produce this lesion was found. If you look in the skiagraph again, you will see the second molar had a very slight area of absorption as compared with the first molar, and they extracted that second molar and got a pure culture of the streptococcus from which the vaccine was made which practically cured his case.

When you look at a series of skiagraphs, and see a large area of absorption at the end of one tooth, and a small one at the end of the other, it does not follow that the large one is the grave one, and I think the dental profession is facing one of the gravest problems it has ever faced. Tomorrow, yes, today, we are challenged to look into a mouth and say what areas of infection are grave, and we cannot answer the question. A great deal of research is necessary on that point. To illustrate, a physician suffering from an acute arthritis presented for obtaining a culture from which to make a vaccine for himself. The physician making the skiagraph for him reported an infection at the apex of a distal root of the first molar. Cultures were made, and nothing grew; the operations were repeated and repeated, and nothing grew, until finally it seemed justifiable to conclude that there was no infection at the root of that tooth, the history of which had been that it had been filled with oxpara. After thirteen or fourteen efforts to get a culture, a pure culture was obtained. How? By working down into that canal a sterile culture medium, and growing the organisms in their natural habitat, and then removing a culture and growing them under artificial conditions. What was the explanation for that? Simply that organisms growing under certain particular environment will not grow in our artificial environment unless it very nearly approaches their accustomed environment, and we have a typical ærobic organism, changing its characteristics and coming to live only in an anærobic environment.

I want you to proceed with the operation on that dear friend, and put in the root filling, and see whether the success of that operation is not measured by the amount of *honest effort* that you put into filling that root canal; in other words, just in proportion as we realized the price paid for a failure do we realize the price we must pay in effort to avoid or prevent that failure.

I want to emphasize one other point, though I have used more time than I should. Doctor Best has used the word "absolute." That is a dangerous word around Cleveland, and he uses it two or three times in connection with root filling, saying that that root had absolutely no root filling material in it. I want simply to challenge or emphasize this point, which is that the opacity of a root filling material determines whether or not it will show in a skiagraph, and we are not justified in saying from a skiagraph whether it has been filled, for some materials do not show a very good shadow, compared with gutta percha or other compounds that have a high per cent. of a heavy metallic oxid. There are good compounds that do not cast a good shadow, so I want to emphasize the fact that we should be charitable, and particularly that we emphasize that not finding the shadow on the skiagraph does not prove that that root was not filled.

One other point I wish to bring out. Doctor Best stated that if you take the wire and lay it on the skiagraph, you will determine by measurement whether you are at the apex of the root. I want to emphasize that there is only one position in which you can place your film and direction for the rays, in which the length of the root will be the same as it is on the film. If you will imagine this base line as being the direction of the rays, you will recognize that the length of the shadow of this cane will depend upon both the angle of the cane to the rays and also that of the object on which the shadow falls. It is longest when it is at right angles to those rays, and it is shortest when it approaches the parallel of the direction of those rays of light. Now, then, if we could place our film parallel to the root of the tooth, and then place the source of light or X-ray far enough away, say, at infinity, the length of the tooth would be the length of the shadow, and the length of the shadow would be the length of the tooth, but in the upper arch we cannot place our film parallel with the tooth. Now, get this point, that the position in which you place your tube is at right angles, not to the root, not to the film, but to a line half way between the root and the film.

Dr. L. L. Zarbaugh: I have had this paper for ten days, and I made a copy of it and read it over every day for ten days. The paper that I had was just what the doctor read here, so you will readily understand that there is a whole lot more to this subject than what appeared in the paper that I made a copy of. He says in his paper that it is a dangerous subject. It is a whole lot more dangerous since Doctor Price got through with it, and I think I will have a radiograph made of an old molar of mine. Maybe that is what is the matter with me.

Now, I am reminded of a story. It is an honor to be allowed to discuss a paper before this society, but I am wondering whether this is not a punishment. There was an Irishman being rail-ridden by his townsmen, and after they had taken him all over the town, through the principal streets, they asked him how he liked it, and he said, ''Well, if it wasn't for the honor of the thing, I would as soon walk with the rest of ye'z,'' and I would as soon listen with the rest of you.

I am not going to read my paper, because it does not fit the discussion at all. I heard a dentist in Toledo, coming down in an elevator, say that he had made a bridge and couldn't get the darn thing on. The other man said, ''Take it over to so and so, he can fit it if it comes within a foot of it.'' I am not mentioning any names, neither of them are here, but sitting back there, listening to the discussion, I was just wondering how much good is this going to do. Is it going to reach the people that need it most? There are probably a lot of dentists at home this afternoon filling root canals in the same old way, totally ignorant of the trouble that is likely to occur to them or to their patients. It occurred to me that these things ought to be brought to the attention of the members of the society, whether they come to the meeting or not. I believe that our society does not do enough for the members, and does not do enough for the patient. I am free to say that I don't belong to the ten per cent. class; I presume I belong to the ninety per cent. class—but I don't like to think that nine out of every ten canals I have tampered with are not successful. It may be.

When I first read this paper, the thing that impressed me (I couldn't get it out of my system, so I am going to give it to you, although after seeing the slides and hearing the discussion it does not quite fit)—but after I read this two or three times, it appeared to me like this: Suppose somebody came into this hall, and quietly announced to us that he had an instrument with him that had discovered a dangerous fire in this building but sorry to say it does not point out the exits. That is radiography in root canal operations; it will tell us if the work is properly done *after* we have completed the operation. The profession is in the same fix that the people in this hall would be in, in case of fire; every fellow would crawl out of the first hole that looked like an exit, and that is what the profession has been doing to get away from this troublesome question. There are, however, a number of exits out of this question; I will not presume to say where they lead to, but I believe that many dentists are going that way. These exits may be found in any of our dental journals. I found the following advertisements reading like this: ''Treatment of teeth made easy.''

There is a hole—an exit—that we find in our dental journals, that probably a good many fellows are crawling through.

Here is another one; it says, ''An ideal permanent filling for root canals.'' There are directions for use, and below it says, ''This preparation is absolutely guaranteed.'' It tells you to dry the canal, slightly heat with warm air syringe. It goes on and says, ''It is immediately forced to the apex of the tooth, and completely fills it and seals it.'' There is another dandy hole for a lot of fellows to get out of.

Here is one lays claim to everything: After explaining how easy it is to fill a putrescent root canal at the first visit, the advertisement further states, Blank can be softened at any time by the application of Blank liquid, when it can be easily removed.

That is one redeeming feature. Some of those things that you get up into the root canals are awfully hard to get out.

Another one says, "Are you treating root canals surgically? It is a surgical operation." That seems more sensible.

Now, talking about exits, there are a number; the doctor said there were two hundred. Doctor Evans, speaking the other day, said every fellow had a method. Getting down to brass tacks, why is it necessary to have so many methods?

We have a scientific research committee. We have the radiograph. Now, the radiograph is the little old truth teller, and it certainly is the duty of the officers of our national, state and local societies, with the aid of the ten per cent. of which Doctor Best spoke, to point out a true exit, or ways of escape from these non-aseptic root canal operations. Have a committee appointed to make tests of these preparations, and see if blank paste and hot air will seal the root clear to the apex. Let us have light on the subject, and no beating around the bush about it. If any preparation advertised will not make good in the light of radiography, let every member of our societies be told the truth of the matter as determined by the committee's findings.

I say, more power to the essayist and radiography; this is the most important step that has been taken in this direction in the history of our profession. But we must not forget the hundred or more different methods of doing root canal operations; many of them are faulty, and I can see a heap of real work before our national and state societies when they attempt to show us a way out of our difficulties. We come to these meetings once a year and pay dues, and then forget all about it until we come again. I would like to see a bulletin reach the members once a month from this committee, and if it takes the skin off somebody, all right, take it off.

Dr. L. E. Custer: As I see it, Doctor Best's paper is a plea for better pulp canal operations. If there is any one operation in dentistry that has gone through the gamut of experimentation it is the management of pulpless teeth; and if it be true, as he says, that ninety per cent. are still imperfect, we are not through with this subject yet and we should not be content until we have reduced the percentage till the proportions have been entirely reversed. I believe that you will all agree with me that there are about ten per cent. of these root cases wherein it is mechanically impossible with all our resources at present to perfectly clean, sterilize and fill. The X-ray is a reliable aid in determining the number, size, shape and length of roots and to a certain extent the thoroughness of the root filling, but the fine point as to the absolute certainty of complete canal filling is beyond the power of the X-ray; I mean by this, that the X-ray will not tell absolutely whether the root filling entirely fills all the ramifications and hermetically seals the apical foramen when the present root fillings are used. Gutta percha and the like show very well under the X-ray but not until we use a material of higher specific gravity will the X-ray show the finest definition of the root filling.

I shall state that a perfectly clean pulp canal, thoroughly sterilized and perfectly filled with an non-irritating and non-changing material will never abscess. Three things must be thoroughly done—cleansing, sterilizing and filling. The dental profession is indebted to Dr. J. R. Callahan more than all the rest of the profession put together for showing us how thoroughness in pulp canal operations can be accomplished. He has simplified and presented the best methods of meeting the first and third conditions, namely, thorough cleansing and thorough filling. The greatest difficulties lie here. The pulp canal having been cleaned of pulp tissue it is an easy matter to sterilize. The introduction of sulphuric acid in root canal work by Doctor Callahan, to my mind, was the greatest step in advance. This acid not only opens up the finest canals but it defines the canal openings and absolutely sterilizes the canal, thus preparing it for the final filling. I would recommend tungsten for this work instead of steel. This metal is stiff and is not affected by the acid.

I believe also that Doctor Callahan's method of root filling, which is a solution of resin in chloroform followed by a gutta percha cone, is the best yet advocated.

Nature has treated the dental profession most kindly in the pulp canal proposition. I believe with the essayist that faulty operations are more to be found in connection with the pulp canal than with any other work and the proportion of abscesses is very small as compared with the number of imperfectly filled pulp canals. A perfectly filled pulp canal is the exception, and yet how few abscesses proportionately do we see! And while Nature tolerates thousands of pulp canal insults, we should not rely upon this fact but we, with the essayist, should increase our efforts to thoroughly clean, thoroughly sterilize and thoroughly fill all pulp canals.

Dr. W. P. Smith: I wish to add my commendation and emphasize my appreciation of this paper.

I believe it is one of the most important subjects with which the dentist has to deal. It is the foundation upon which we depend to carry the structures upon which we lavish our utmost skill, but, alas! how often do we see some beautifully constructed crown or bridge utterly fail because of faulty root canal work.

The essayist has well said that this is a dangerous subject—dangerous to the health and happiness of our patients, as well as to our own reputation and self-respect; but with the advent of the radiograph it places in the hands of the painstaking operator a means of detecting many of his failures, yet I believe there are many canals, which for physical or mechanical reasons *cannot* be properly filled. Naturally these cases would have to be considered with the ninety per cent. of faulty operations.

I am disappointed that the essayist did not give us some hint, based upon his findings in his research work, as to what is the most common cause for failure in canal work. Is it the means used in devitalizing? Is it faulty manipulation in cleansing the canals? Or the substance used to fill the canals?

I believe the conditions under which the work is done has a great deal to do with the result of the operation.

The use of the rubber-dam, which is considered obsolete by many, is, I believe, of great importance in root canal work.

In speaking of the conditions under which many canals are filled brings to my mind an incident which came to my notice during a vacation trip a couple of years ago. We stopped in a small country village to replenish the inner man, as well as the gasoline tank, and incidentally I visited the one barber shop in the village, which was in charge of a wide-awake young fellow who was apparently quite prosperous. The shop was unusually clean and tidy, and as I sat in the chair I noticed a sign displayed quite conspicuously on the wall, which read as follows: "We aim to please." "All work guaranteed," and the last line, which was heavily underscored said: "Everything perfectly *Septic.*"

The young man's heart was in the right place, and he meant well. The average fee charged for root canal operations is, in the majority of cases, entirely out of proportion with the gravity of the operation. I believe there is no operation which the dentist is called upon to perform which requires as much skill and knowledge as root canal work. The time required plus the nerve energy consumed, together with the strain on the sight, places this operation in a class with many of the operations performed by the surgeon.

Yet if we were to demand a fee which would even approximate that of the surgeon, we would be considered in a class with the highwayman.

Again, I wish to voice my appreciation of this paper. I do not believe there is an operator present today who has seen the pictures and heard the paper who will not feel the effects of the uplift, and will go back to his office to make a determined effort to improve on his root canal operations.

Dr. J. R. Owens: I have spoken in this room and before the local society so much on this subject, that I don't think any of you care to hear me again. I believe, as many of you know, that this is a very serious matter, and a subject in which dentists are very deficient, and these pictures on the screen and what has been said this afternoon I think emphasize the statement that I have often made.

I think we often recognize these facts, but we want to know how to go about to better them, so my chief object in getting up was to commend what Doctor Best has said about the opening of these minute canals. I think he has told clearly the best way I know of opening up those canals. As you remember, the first is, by means of the minutest bristle, to find the way to the end of the canal, and then take a bristle of the same size and roughen it. Remember that. He has given a splendid idea of how to get a bristle prepared for opening the canal, roughening it between those two fine files, and then rasping out the canal, and then taking the next size larger, and so on. That is an excellent idea, and I will just tell you that if you want to get into trouble immediately, try to go to the end of those roots with any sort of drills made. You don't know where you are at, just as soon as you get started in a canal with any sort of drill, but by using those broaches in that way, you will in many cases get there when you thought you could not, in times past.

Dr. H. C. Kenyon: It has been stated and restated that this is an important subject, and it is hardly necessary to repeat it. When we look into the mouths of patients, and when we see the skiagraphs we have seen today, which probably can be duplicated by any dentist who keeps a record of his skiagraphs and cases, it becomes perfectly evident, and possibly unnecessary to repeat, that this is an important subject. However, some dentists do not think it is important.

Doctor Owens has mentioned one thing that this discussion ought to emphasize, and that is, how are you going to get out of it? Doctor Zarbaugh mentioned in a humorous way some of the holes by which some are trying to escape, and it is some of these holes that I am up here today to protest against. Gentlemen, *I think it is a crime* to put any kind of dope in a root canal for the final filling when you know you have not done the best you can to remove the contents of those canals. You who have had experience know that is being done day after day by dentists who know better, but whose consciences are weak, and who want to get the money easy. They do it just because it is an easy way to do it. I dare say that the conditions that were shown us today were there because it was easier to put oxpara or some other dope into the canals, rather than a proper root filling.

I probably have had a hundred skiagraphs in my collection, similar to those shown today, showing abscesses and carious bone that are due to no other cause than the fact that the dentist who tried to fill the tooth put in cotton with something on it, to kill the bacteria for that particular time, and made no effort whatever to get down into the root canals of the teeth. If we can in some way instill into the minds of our fellow practitioners the fact that it is a crime, absolutely, to fill a cavity over such a canal dressing as that, we will have done a great service to humanity, because one could stand here and repeat without end cases of arthritis and cases of nervous breakdown, and all the array of diseases that have come from the absorption of pus from those closed abscesses. It would probably take an hour, talking as fast as one could, to enumerate the diseased conditions that have been known to arise from the carelessness of dental practitioners in this particular operation, and it is no wonder that we are condemned by medical men who understand these conditions. The good men are condemned along with the men who are doing these faulty operations, and I think we ought to protest against such slovenly methods every time we get a chance. The men who are doing those things are men who, as a rule, are not cognizant of the dangers mentioned by Doctor Price and other discussers today.

Dr. W. P. Horton: I do not rise to discuss this thing, but I want to reply to what the doctor says about the medical men. I have been in practice here sixty-one years, and I would like to know how many medical men any of you know, who know anything about this subject. Of course the medical men are just beginning to learn, but when you take the children that they neglect, and undertake to doctor in some other way, when they will treat them for months for earache when it comes from a tooth that can be cured in twenty-four hours, we are pretty sure that they don't know much about the subject they are treating.

And the cases that they put into the hospital! I had a case here of a young man who had trouble in the second bicuspid and the first molar. He came in in great distress, with neuritis, as the doctors had diagnosed his case; had been in the hospital two months, and was swearing mad when he came in, because he said he had lost all that time and had received no benefit whatever. The whole trouble was in those two teeth, and the way to get at it was to carefully cut down through the crown, and open it up the best way possible; it being pretty sore at the time, a small opening was made to start with and something put in to save that. I put in a temporary opening, and he came in again in two or three days, and the second time I could get in so as to make a wider opening. I treated that again, and after the third treatment he went home and went to bed and had a good night's rest. I put in a temporary filling after about three weeks. Now, he had been two months spending his money, surrounded by a corps of doctors, who ought to know something, and didn't. I would like to know how many of the physicians you sometimes consult know anything about the subject, so in referring you can't refer it to anybody but the dentist, who does know, and if we make mistakes, it behooves us to take more time and give more attention and more care to the treatment of these cases.

Dr. Isidore Lyman: I wish to defend the ninety per cent. of the failures, because I might be considered a failure myself. Indeed, I bear that percentage of failures, but there is an economic condition underlying the ninety per cent. of failures. If the economic condition were not present, there would be twenty-five or fifty per cent. of failures. We who deal with the ninety per cent. of the common people who cannot afford to pay for our services, from whom we cannot hope to profit much, or to make them realize that with the expert they would have better success.

I am reminded of a story. Doctor Zarbaugh indicates by his name that he is of German extraction, but he tells an Irish story. I will take one about my coreligionists. There was a man, a Jew, who was superintendent of an estate, but the dogs of the estate took a dislike to him, and he was afraid of them. Finally he went to his rabbi, and asked for some remedy, how to be able to silence the dogs, and finally the rabbi told him to wear a certain talisman and say certain prayers. The next day he wore the talisman, and was ready to say the prayers, but the dogs attacked him and caused him more injury. He came back to the rabbi and complained that the remedy was a failure. The rabbi said to him, "Did you wear the talisman?" He said, "I did." The rabbi said, "Did you say the prayers?" The man said, "I was ready to, but the dogs wouldn't let me say the prayers."

It is impossible for these people to realize, this ninety per cent. of the common people, that we deserve seventy-five per cent., or even one-tenth of the fees we charge for doing good root canal work.

I happened to listen to a lecture to the law class, by Major Miller, of the Bar Association, and in speaking about lawyers, how they are the butt of merriment, he said that lawyers are what their clients make them. Dentists are what their clients make them. They do not realize that our work is medical, they think that our work is mechanical. We can only hope that the younger generation, through the efforts of the Mouth Hygiene Association and other sources, will profit, and that the coming generation of dentists—it will not be in our day—will have ninety-nine per cent. of success, and that one per cent. of failure will be natural.

Dr. Charles I. Keely: Doctor Best has given us an excellent paper and an ideal method for root operations. I should certainly try it were conditions favorable, but unfortunately I do not possess an X-ray machine nor have I one within twenty-five miles of my office and I think the great majority of us are in the same situation.

I did not intend to say anything when I came up here this year, but my friend over here spoke about the criminals. I am a criminal, and I have been a criminal for the last thirty-five years. I don't want you to understand that I don't try to get to the apex of every root, for I firmly believe that a root filled to the apex with a solid filling is better than any dope you can put there, and Doctor Callahan with his rosin preparation has given us the best and surest method we have ever had for this. But we all know we cannot reach the apex of every root. I think I am as persistent as any one. I have worked for weeks trying to get to the apex of a root, not only by instrumentation, but by sealing it with sulphuric acid.

Dr. William Taft, of Cincinnati, was one of the finest operators we ever had in the profession (as were all of the Tafts). He suggested iodoform and glycerine to me thirty-five years ago, and I have used that in every root I have filled, where I was not satisfied that I was reaching the end of the root with mechanical openers. I don't want to throw bouquets at myself, but I think I have had universal success. I am working for patients that I worked for thirty-five years ago, and some of the roots of teeth that I filled this way, where I was not satisfied I had reached the apex, are giving good service today. I have had dentists tell me that the iodoform would be absorbed. Well, suppose it does absorb, what have you left? You have free iodine, and what could you have as a better sterilizer? Gentlemen, try it and see.

DR. C. H. OAKMAN, Detroit: This is a very interesting subject and while listening to the various discussions my thoughts have been mostly along surgical lines. It would take too long to enumerate results of septic conditions found at the apices of the teeth, as well as other septic oral conditions.

It has been my sad privilege several times in the last few years to operate on patients for cancer of the superior maxillary, in the region of the antrum. I will give a brief history of a young woman, twenty-four years of age, who had had the roots of two upper molars filled. She complained of pain from the time they were filled, and made frequent requests of her dentist to relieve her of the pain. While at no time excruciating, it continued for two years, by which time she had protrusion of the left eye. She had been treated by her oculist, who was unable to correct her vision and who referred her to me.

The molars were extracted and a microscopical examination of the adjacent tissue showed it to be carcinomatous. A radical operation was performed and most of the upper jaw removed. The patient lived but six months after the operation.

I believe that forcing root fillings, such as was done in this case, far into the apical space, setting up irritation, is not good practice. Had this condition been discovered early in its course, it would probably have been the means of saving her life.

It is desirable to try to save most teeth, believing that after they are filled they will fulfill their necessary functions. No doubt we go too far in trying to save some teeth. Teeth that are badly decayed, pigmented and fragile, with a persistent flow of serum which does not tend to cease, should be extracted on general principles. Such teeth as above mentioned were filled when granulation tissue was present near the apical spaces, with the hope that they would last a while at least. It sometimes occurs that a root filling forced into this area sets up an irritation in a tissue which may be in the precancerous stage and so aggravates the condition.

In regard to the apices of the teeth, it is not always the amount of pus present which causes the most trouble. The fact is, that in some cases a very small amount of infection will produce disease when the patient's vitality or resistance is below par. It has been my privilege, also, to have seen several persons relieved of arthritis by the elimination of a small amount of pus.

Sir William Hunter, of London, England, threw a bomb into the dental camp when he stated in the medical journals that much of the dentistry of today was a curse to humanity. This remark was sufficient to get the dentists by the ears for some little time. We felt indignant and injured at these remarks and were tempted to resent them. But after cool deliberation we knew that he was justified to a great extent. The causative factors were the faulty construction and insertion of bridges, which should never have been placed in the human mouth.

He related a case of sepsis due to improper crown and bridge work in the mouth of a man where he found it necessary to perform a major surgical operation for necrosis in order to save the patient's life.

You who are devoting your energies to the treatment of pyorrhea and other oral conditions, realize more fully than ever before the truth of Sir Hunter's remarks. I believe that he has done a great deal to awaken the dental profession to the full realization that greater care must be taken as to the proper location of inserting gold crowns and bridges in the mouths of their clients.

I am satisfied that he has done more good than harm by these remarks.

Doctor Price asks, "What is the price of these failures?" It is, ladies and gentlemen, the loss of life in a great many instances. If dentists would ask for consultations more frequently, the result would be to their advantage and at the same time increase the patient's confidence in them. If we work in harmony, our profession will be elevated and everyone therein will be benefited.

Doctor Best (closing): I must say that I deeply appreciate the spirit in which this subject has been received. Doctor Price has jokingly remarked about my use of the word "absolutely," and mentioned the fact that possibly some of these root canals were filled with paraffine. They "absolutely" were not, for I had the privilege of opening into them.

The mention of Doctor Callahan's name reminds me of a remark which I had intended making but omitted. It is very difficult to present anything new or original in the technic of this operation so I am claiming no originality whatsoever but have combined the methods of several operators and tried to eliminate the unnecessary or dangerous methods sometimes employed, and present a simple and safe procedure.

Doctor Custer made a remark, and I am very glad he did, regarding the percentage of roots which are turned upon themselves, which are the twisted roots, and the ones which turn at right angles, etc. Ten per cent. is about what I have found of these cases, although many of us would like to make ourselves believe that the percentage of these cases is very much larger than that, *very much larger*, but it is not, gentlemen. The Lord is very good to us on that particular point; there are not so many of these cases where you can't get around or get to the end of a root, because the root turns at right angles to itself.

There was one point which I intentionally left without any remark and I wanted to see if somebody would pick me up on it. Probably some of you do not know that in the end of a root there is seldom just one foramen but we find many foramani. In my experimental work I found a lower molar with eleven foramani and one was on the distal surface of the mesial root about one-sixth of the way down from the bifurcation. Now, is it possible to fill those foramani with one gutta percha cone? I believe we must introduce into those canals a filling which, when it is introduced, is more or less in liquid condition, and which will seal those foramani which we are not able to locate. That is why I have abandoned the use of the gutta percha cone, as a cone, in the filling of root canals.

Doctor Smith made a remark regarding the results of research work. I never like to present any idea unless that idea is based upon the actual findings in a certain number of cases. I have some intensely interesting things which we are working out in the bacteriological laboratory regarding the findings of the conditions around the ends of these teeth, and what I have said today, regarding the conditions existing around these teeth, almost fades into insignificance when we realize what is actually happening, and what I have not mentioned today at all. I have told you the percentage of cases where the trouble is not manifested in the mouth. Where *is* it manifest? The dentist does not recognize the trouble, much less would the patient be expected to recognize the source of the trouble, and consequently they go to their family physician. The physicians are waking up to the fact that many of these maladies which they have been trying to treat are traceable to some region which can be located by the radiograph. The point is this, what is our position going to be when the physicians send these patients back to us, with the radiograph showing distinctly that in one, two, three, four, maybe five, six, and many more cases, we have established in those mouths the cause of their trouble? That is what I mean when I say, what is our position going to be? It is either, gentlemen, that we are going to wake up and solve this problem for ourselves, or the physicians and surgeons are going to compel us to do it. That is what I mean when I say that this is a vitally important subject, and we cannot give it too much consideration, and when I say that I no longer believe that there are any excuses for this class of work, I mean just what I say, because just as long as we allow ourselves to make excuses for these operations, just so long do we keep ourselves from advancing and placing the operation where it ought to be placed.

It is going to be, I believe, a very short time, with the forces we have at work, when we will have accomplished what we are trying now to accomplish, and when it will not be a case of making excuses because we don't get to the end of the root canals, but it will be here and there an exceptional case, where we possibly did not get where we ought to, but the large majority of cases are going to be roots which are filled to the end, if it is possible for human ability to do so.

A USEFUL SUGGESTION

BY H. O. BARNES

So many dentists have trouble with the dentiscope light going out just when they most need it.

In almost every case the trouble is due to the heating (or resistance) coils giving out.

In such a case, when one *must* have a light and there is not time to get a new burner, proceed as follows:

First—Turn on the current.

Second—Hold the flame of an alcohol lamp or bunsen burner just so the light filament gets heated up.

When hot enough the electricity will flow in and do the rest and the light will burn without further trouble.

This was vouched for by a dentist who tried (and thought of) it, although I have never seen it done.

Though the seasons of man, full of losses,
Make empty the years full of youth,
If but one thing be constant in crosses,
Change lays not her hand upon Truth.
—*Swinburne.*

TECHNIQUE OF ROOT TREATMENT.*

BY E. S. BEST, D.D.S., MINNEAPOLIS, MINN.

In presenting this clinic I will mention only essential factors, as our time for each class in a progressive clinic is very limited.

First—Wherever possible always adjust the rubber dam, properly applied with a rubber dam holder, which can either be destroyed or sterilized after each patient. Do not fail to use a saliva ejector and one which will not injure the soft tissues.

Second—Open cavity very liberally, gaining easy access to all the canals.

Third—Use finest smooth broach which can be obtained; work gently and patiently into the canal as far as you possibly can. Then with the same size broach made into a file by rubbing between two flat gold files, file the walls of the root canal. Increase the size of smooth and filed broaches until about six different sizes are used. Then use fine reamers followed by sodium of potassium applied with Young broaches or sulphuric acid fifty per cent. applied with fine iridium-platinum broach. Now to measure our progress. In the margin of the cavity through which we are working and preferably just over opening into canal, cut a small groove. Place fine gold wire in canal and bend through the groove and cut off. Seal with temporary stopping and radiograph. To prove there is not distortion, place wire removed from tooth on radiograph and see that it is the same length as its shadow. Now the radiograph shows the end of the wire either at the end of the root, through the apex, or resting somewhere between crown and apex. This shows you the progress of your operation. Place smooth broach on radiograph, point at apex of root. Where wire turns (through groove cut in margin), place drop of wax on broach. In the mouth this gives you the distance from groove to the end of the root, which is the same as the distance from drop of wax to end of the broach. Assuming root canal is opened to apex, moisten with acetone and thymol and absorb with cotton. Do not try to remove with chip blower or compressed air. Then lubricate walls of canal with liquid petroleum. Absorb any surplus which may be in bottom of canals and place point of high fusing paraffin and bismuth trioxide in canal, using electric root canal dryer with thirteen amperes. Melt paraffin and flow to end of root. Fill canals about three-quarters full and balance with oxychloride of zinc cement.

Time permits the describing of only one method of doing this work. There are others, viz., Doctor Callahan's, this being a most excellent one.

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*Description of clinic given at Northern Ohio Dental Society, 1914.

LAW AS A SERVICE TO DENTISTRY*

BY J. F. ALCORN, D.D.S., ST. LOUIS, MO.

WE OF THE CIVILIZED WORLD are born with a conscience and a fair conception of right and wrong. We are provided through ancestry with a keen apprehension of justice to ourselves and some knowledge of the rights of others, and being reared in a christian community, are admonished to apply the golden rule. Thus we are endowed with a natural knowledge of right living which is supposedly enhanced by education and experience, and as we near the age sufficient for a choosing of life's work, our erudition and ethical scope should have gained some degree of efficiency.

However, our debut into business carries with it a certain amount of memory lapse; and any conscience, knowledge of self-sacrifice and golden rules we may have had or acquired, seem to have been somewhat shrunken if not often entirely lost.

We emerge from our childhood with distrust and a watchful eye toward all, or cultivate a kind of respect for ourselves and our personal advantage. We misunderstand and in turn are misunderstood. Our motives, when most philanthropic, are often misjudged and many times deduced as cunning graft. We desire and often seek revenge for injuries, real or apparent, received through the jostle of business, the shrewdness of trade and the unscrupulousness of fraud. We allow ourselves to be led into heated debate created through a simple difference of construction or interpretation of a single subject. Many times selfishness or lack of altruistic benevolence plays a leading part in the formulation of questions that require more than mere argument for their decision. These unspiritual or animal characteristics of mankind are, like conscience, born within. They, like weeds and cacti, grow in soil unproductive of anything good, live forever and cannot be exterminated. Through the ages of man's existence the animal traits have always predominated, giving way, it is true, in a marked degree to the advance of higher education, but are still prevalent.

With the beginning of civilization, a man's honor, breadth of intellect and fellowship could not be relied upon for the establishment of unselfish social intercourse. The formation of rules for the suppression of his lust for combat or revenge, precepts for his guidance, laws for his government and courts of judgment were found essential, not only for the punishment of the unjust and the protection of the deserving, but also for the umpiring and final decision in dispute.

We find today the governing rules of early days diffused and obliterated in a great mass of law, and it, though gorged to proportions most unwieldy, is still proclaiming, in a jurisprudential sense, the regulation of human conduct provided by rules established by paramount authority and observed by the courts in the administration of justice.

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*Read before the St. Louis Society of Dental Science, 1913.

The part of the criminal and civil law directly of interest to the dentist as such, comprises the established legal principles covering the mutual obligations and relations between the dentist and his patient and the statutes governing the practice of dentistry in the different states.

A dental practice affords a mutual responsibility of both practitioner and the public whom he serves. The responsibility of patient to the dentist is *nil* in the safeguarding of the practitioner's reputation and professional standing, therefore, it will be beyond our present consideration.

The dentist's responsibility to his patient lies mainly in the faithful performance of his duties, keeping in mind both honesty and social conduct within his offices with a regard to possible misconception of his purposes. He must exhibit the skill befitting a practitioner of ordinary ability, the word "ordinary" being modified and influenced by the dentist's surroundings; an urban practice affording a greater opportunity for education and advancement and a consequent higher plane of skill than one rural.

The dentist's responsibility begins with his acceptance of a patient as such and, with the undertaking of the work concurrent with the acceptance, he binds himself to a contract either written or oral; the latter having the same validity in general and equally as binding as the former, but lacking in value simply through the possibility of there existing the chance to forget, distort or append. When a contract is oral it is classed as "express" or "implied." "Express," is one in which both parties have agreed to specific details. For instance, upon careful examination of a patient's mouth, the dentist finds certain work to perform, and for which he advises certain treatment and asks a certain fee, to all of which the patient agrees, thereby forming the contract, one party to perform the work in an ordinarily skillful manner and the other to pay the fee required. The contract is "implied" when there is no thorough understanding of the extent of service required, how much time will be consumed, what materials will be used and what fee will be asked. In such instance, a court would imply that ordinary skill must be exercised, fit material be used and a reasonable fee be charged which the patient must pay.

In the professional examination of the patient, diagnosis must be careful and precise, thereby avoiding treatment contra-indicated or that which an ordinarily skillful dentist would deem unnecessary and which could be a subject for a possible charge of malpractice.

In proceeding, if the patient has not left all to the skill and judgment of the dentist as to what work should be done and how accomplished and what materials required, the dentist must obtain his or her full consent before engaging in any operation, that is, the patient must acquiesce in the extraction of a certain tooth or in the treatment of a lesion in the soft tissues or in the use of a certain material advised for the filling of a certain tooth. As every person has the right to forbid anyone, laical or professional, to do any act involving the physical touching of their person, the dentist's patient at all times must be given the right of final arbitration whether his ideas relative to the case in hand be practical or utterly impractical. The failure on the part of the dentist to use materials agreed upon or those unfit, whether they be so from lack of knowledge of quality, deterioration or misrepresentation, places him in a position to be liable not only for the loss of fee but for damages.

Advice appertaining to a case in hand must be given when necessary, with ordinary skill and veracity. When a patient has asked that a tooth be extracted where extraction is unnecessary, it is the duty of the operator to advise negatively, proceeding only upon the insistence of the patient. If a patient of minor age, unattended by parent or guardian, insists upon treatment unnecessary and against the best judgment of the operator, the dentist, in such instance, who complies with such request lays himself liable to criminal prosecution.

The dentist must not experiment upon his clientele. A standard of treatment having been adopted by the profession at large, in all ordinary cases, the dentist is required to follow them. By standard of treatment is meant that which is in vogue generally and characterized as practical by the professional men of ordinary ability. For instance, the employment of cotton saturated in some medicinal preparation for permanent root canal fillings, a method once used by some operators, could not possibly be classed as standard today, while, on the other hand, there are a dozen different good methods being practiced, all of which must be classed as standard. The courts do not pretend or wish to establish certain standard treatments in specific diseases, knowing full well that such an opinion would serve only to stunt progress, would result in a menace to further medical and surgical discovery and achievement. The dentist must keep pace with the progress of his profession and be able to give the benefit of advanced and proven treatments.

He must be, not only sterile throughout operations, but cleanly about his person as he may be held liable for the transmission of disease whether by instrumentation or personal contact. In like manner is he responsible for his assistant or attendant and also for any omissions or commissions due to them. An unregistered attendant cannot perform one single operation without placing the employer in a position of liability.

These are the principal and fundamental laws to be observed in the practice of dentistry from the standpoint of safety to the practitioner's personal and professional reputation, and are embodied under the classifying heads of assault and battery, and malpractice which are defined thus: Assault and battery consists in the unlawful touching of the person of another. Malpractice is bad, wrong or injudicious treatment of a patient professionally in respect to the particular disease or injury, and which results in injury, unnecessary suffering or death to the patient, whether proceeding from ignorance, carelessness, want of proper professional skill, disregard of established rules or principles, negligence or a malicious or criminal intent.

Besides assault and battery and malpractice, there are other forms of charges, equally if not more dangerous to encounter, of which rape and homicide are most important.

If possible, the dentist should always, when treating a woman, have someone in his office other than himself and the patient. He should never, on any account, place a female patient under the influence of any anesthetic without a third person, preferably a woman, present during the whole time the patient is under the influence of the drug, for it is a well-known fact that one of the effects of anesthetics is to induce hallucinations of a sexual character.

The rules are few and seemingly far-fetched and in a community of Arcadians would rot and die for want of exercise. But we must consider our actual surroundings, the extreme flexibility of present-day law and the hoard of shyster lawyers, the vermin of the legal profession, gluttonously grasping any dissatisfaction and eloquently magnifying it to the point of fee. Add to these the fact that we must handle strange people of unknown integrity and social standing, deal with those capable of stooping to any level for a money consideration, and others knowing nothing too mean or contemptible for their undertaking in a spirit of revenge. In the hands of such, with the faintest semblance of a misstep, these laws become a persecution and are made to bristle with terror to the innocent practitioner. He discovers that to disprove false evidence and accusations is often impossible and that injustice is almost as easily obtained at the bar as justice.

It is not sufficient that the dentist has established a perfect defense. If his case be before a jury there is ever existing the questionable qualification of each juror, their special aptitude or ability. Their invariable, unalterable sympathy with a plaintiff in a damage suit is characteristic, especially when the defendant is an individual or corporation evidencing some degree of prosperity and the plaintiff a woman.

There is absolutely nothing to be gained by a practitioner of any branch of the healing art in the airing of his methods of practice before a judge and jury of a criminal court and the public. The damage wrought is immeasurable in the mind of the laity even though he be declared victor. Vindication is not real and it needs but a second victory oftentimes to enforce the selection of another location.

Therefore, if there is any method whereby we may fortify ourselves against the chance of being called upon to play the part of defendant in a criminal suit, it behooves us to take the precaution to barricade ourselves with the knowledge of that method.

Newstead at St. Louis Avenue.

PATHOLOGY, DIAGNOSIS AND TREATMENT OF THE DENTAL PULP

BY H. B. TILESTON, D.D.S., LOUISVILLE, KY.

IN SPITE OF THE VOLUMINOUS WRITINGS in papers and text books that have appeared in recent years on the diseases of the dental pulp and their treatment, I believe there is still quite a general disregard of their teachings, and a tendency to underestimate the value of a vital pulp to a matured tooth.

The technic of pulp destruction and its removal, and even the chemistry involved in the treatment of putrescent pulps and the filling of root canals, are all fairly well understood and intelligently practiced by a majority of dentists, but when it comes to the diagnosis and treatment of the diseases of the pulp with a view to its conservation, there is either a woeful absence of scientific knowledge of the subject or a disposition to view the necessary time and patience involved as not worth while. This latter tendency arises out of the lack of appreciation of the true value to a matured tooth of a vital and healthy pulp.

Every intelligent dentist knows that it is a dire misfortune for an undeveloped permanent tooth to lose its pulp, but is there as general recognition of the fact that it is only a little less unfortunate for a fully-developed tooth to lose its pulp? In contemplating the latter event we must consider the necrotic changes that take place in the dentin and enamel of a pulpless tooth. First appears an opacity, a dull lifeless appearance, not very marked at first in cases that have been properly handled, but growing progressively more pronounced. This is the forerunner of discoloration which creeps on, very slowly maybe, in a tooth from which the pulp was removed in its recent state, but gradually growing darker, while the enamel and dentin become brittle, the tooth becoming liable to break or split under stress and the enamel to readily flake off; finally the tissues about the root begin to recoil from it, the tooth becomes loosened, in some cases the root is partially resorbed and finally nature casts it off as a foreign irritant. Still, in spite of this doleful death history, a pulpless tooth is not a useless thing, for, fortunately, it may take years for the above-mentioned events to run their course, during which time the tooth may render much service, but eventually the end will be as depicted. In marked contrast, a neighboring vital tooth still stands in all its pristine strength and beauty, to prove the value of a living pulp to a matured tooth.

Again, the difficulty and uncertainty attending the perfect cleansing and filling of pulp canals, the overlooking of unusual bifurcations and the frequency of crooked and constricted canals, all of which contribute to the liability of abscess and chronic fistula, should give us pause ere we ruthlessly destroy a pulp.

And yet, however important it may appear to save all tooth pulps, it is not always possible, and in many cases not even advisable to attempt to do so.

We now come to the study of the pathognomy of the pulp, the consideration of the signs and symptoms, the diagnosis and prognosis of the various affections to which it is liable.

The diseases of the tooth pulp are not numerous. The hyperemias, active and passive, inflammation or pulpitis, and suppuration comprise the list of the destructive diseases: the secondary dentin formations and pulp stones, the constructive.

I do not include hypertrophy and sclerosis of the pulp because they are forms of chronic pulpitis and are states of degeneration presaging the early death of the organ.

In hyperemia there is an abnormal amount of blood in the vessels of the pulp. When the excessive blood is arterial, we have active hyperemia, and when it is venous, we have passive hyperemia. The active form always precedes the passive, but the latter need not necessarily follow as a sequel to the former in all cases.

Active hyperemia is caused by some mild form of irritation such as erosion, abrasion, caries or shock, either physical or thermal.

It is manifested by a narrowing of the temperature range, pain being instituted by either an increase of temperature a few degrees above blood heat, or a slight reduction below, the latter being the most noticeable. A notable characteristic of active hyperemia is the rather quick return to comfort after one of these shocks, with no recurrence of pain until again irritated by a change of temperature.

The observation of the foregoing symptoms constitutes the diagnosis of active hyperemia. The prognosis is favorable and under proper treatment, prompt and complete recovery is the rule.

The treatment consists in the discovery and removal of the cause of irritation and the placing of the pulp in such condition that it may have what has been called "Physiological rest," which means that the organ may again perform its normal functions and be able to gradually eliminate the excess of blood through the natural channels.

If a carious cavity is the cause, it should be cleaned out and dressed with a soothing antiseptic such as oil of cloves and phenol, or phenol and thymol made into a paste with oxide of zinc or calcium phosphate, and sealed with gutta percha preferably, because it is a non-conductor, though cement may be used. Counter-irritation upon the gum tissue over the tooth and for some distance to each side of it, using Buckley's refrigerant, will aid in the depletion of the pulp.

If a metallic filling which has been placed too near the pulp is the cause, it must be removed and the same procedures mentioned above, resorted to. The slight sensitiveness to thermal changes, especially to cold, which often follows the insertion of metallic fillings in hyper-sensitive cavities, is a manifestation of the earliest stages of active hyperemia, but in most instances these mild shocks only seem to act as a stimulus to the odontoblastic cells, rousing them to renewed activity and inducing a deposit of secondary dentin in the tubules (eburnation) and upon the wall of the pulp chamber, thus protecting the pulp and eliminating any danger of serious trouble. These cases require no special treatment. It has been observed that active hyperemia may sometimes follow as a sequel to an attack of la grippe.

Passive hyperemia arises out of the active form when the latter receives no palliative treatment or when the causative irritant is of such a severe character that it pushes the hyperemia rapidly through the active into the passive stage. The excess of blood being retarded in its efferent flow by the constricted apex of the pulp canal, especially in single-rooted teeth, quickly brings about a condition of congestion, a much more serious affection than active hyperemia. Hemorrhagic infarction is apt to supervene, which is almost certain to result in the death of the pulp. Strangulation at the apex with resultant death of the pulp is also a liability.

The diagnostic symptoms are markedly different from those present in active hyperemia. In the thermal test it is observed that an increase in temperature provokes painful response more promptly than a decrease, though both heat and cold produce paroxysms of pain which are throbbing in character and much more prolonged than in active hyperemia. There is a sensation of fullness in the tooth and if the pulp is exposed the color is seen to be a dark or purplish red like venous blood, instead of the bright pink of the healthy pulp. While the pain when once induced by any cause, continues with much severity for a considerable length of time, it will finally return to comfort and remain so until again aroused by an irritant, which distinguishes this affection from inflammation.

The prognosis in passive hyperemia is unfavorable but not necessarily hopeless in all cases.

The treatment consists in efforts directed to the reduction of the vascular engorgement and the relief of pain. If the pulp is exposed so that it can be seen, it may be punctured with a fine sterile broach, and continued hemorrhage induced by syringing with a warm antiseptic solution. A soothing antiseptic dressing should then be applied and the cavity gently sealed and left, if at ease, for several days. When next seen it may have assumed such a favorable aspect that capping may be attempted. If this is done the cavity should be filled with a temporary material until such time as the course of events has demonstrated a full restoration of health in the pulp.

The conditions are more favorable to conservation when the pulp is exposed than when the congestion occurs in a closed chamber, for in the latter case, the great pressure of the accumulated blood not only increases the pain but thrombosis is a certain accompaniment resulting in the extravasation of the red blood corpuscles through the walls of the vessels. These sometimes are forced into the dentinal tubules, where the oxidation of their hemoglobin, after the death of the pulp, causes the discoloration of the tooth so frequently seen.

In the absence of exposure, efforts to reduce the congestion are necessarily indirect. Scarifying the gum over the root apex will help deplete the pulp, or the use of counter-irritation to the extent of producing a blister will prove beneficial. If a cavity of some depth is present, some drug of known efficiency in controlling odontalgia should be placed in it on cotton for the purpose of soothing the pain. Even if the ultimate purpose is to destroy the pulp, no attempt should be made to do so, for obvious reasons, until the congestion has been reduced.

A still more serious affection of the pulp is inflammation or pulpitis. The presence of bacteria, according to Metchnikoff, always accompanies inflammation, but it is now generally admitted that bacterial invasion of the part is not necessary or at least the presence of bacteria cannot always be clearly made out or accounted for in unexposed pulps. The explanation offered is that bacteria reach the pulp through the general circulation. The microscope reveals the presence of white blood corpuscles, in the connective tissue of the pulp, which have been extravasated through the walls of the arteries, such leucocytosis seeming to indicate the presence of bacteria. Inflammation of the pulp is characterized by severe continuous pain, intermittent in severity but never ceasing entirely, which increases when assuming the recumbent position, hence the history of greater suffering at night; is increased by the application of heat to the tooth and relieved somewhat by mild applications of cold.

The prognosis is unfavorable though recovery is not impossible. The treatment is directed primarily to the relief of pain which is generally quite difficult of accomplishment, so much so that many a valuable tooth has been lost by extraction in a fit of desperation.

If the pulp is exposed it may gradually be soothed. If not exposed, relief is sought by external means—counter-irritation, hot applications to the face, hot mustard foot baths, saline cathartics, the exhibition of antipyretics or hypnotics, etc. The extirpation of the pulp under nitrous oxide is the quickest method of disposing of such cases.

When a pulp becomes infected with pyogenic organisms we have suppuration either in the form of ulceration, which occurs upon the surface of an exposed pulp and is not painful except when the escape of the pus is obstructed, or abscess, which is in the body of the pulp at greater or less depth. The latter condition is excruciatingly painful, the pain throbbing with each pulsation of the heart. Application of cold water gives temporary relief only. Hot water greatly increases the pain. Relief comes only upon evacuation of the pus by puncturing the abscess. The immediate effect, however, of opening the abscess sac is usually a great exacerbation of pain, which can now be soothed, whereas before it resisted all such attempts.

The chances of restoring to health a pulp which has been the seat of suppuration are so remote that it is hardly advisable to attempt it.

Pulp stones are often the cause of much suffering though they may be present in pulps without causing any appreciable discomfort. The pain from this source is apt to be lancinating and reflex and is excited by slight reductions of temperature below normal, teeth so afflicted being extremely sensitive to cold and are also responsive to percussion. The only treatment is to enter and destroy the pulp, a notable characteristic being the resistance to the effect of either arsenic or cocain anesthesia.

It is to be noted that all affections of the pulp are usually associated with reflex pains located about the eye, the ear or the temple, or sometimes in another tooth.

Gangrene is not a disease of the pulp and hence will not be discussed here, but I want to mention the use of the galvanic current for the purpose of determining whether a pulp is dead or alive. It is often a matter of importance to decide that question and it is not always possible to do so by the thermal or other tests. The galvanic current gives the most positive and conclusive test as to whether the pulp of a tooth is dead or alive.

HIGH FREQUENCY ANALGESIA.*

BY MILTON D. NEFF, D.D.S., CLEVELAND, OHIO.

The use of a transforming generator induces a high frequency current into inflamed tissue to produce a sedative effect.

The stimulating power of electricity is here utilized in promoting normal circulation of the blood through the affected part, that it may properly carry off the exudates. The vitalizing property of ozone, generated and driven into the tissue by the current, aids in re-establishing cellular functions. These effects are utilized to advantage in most dental affections.

The clinic is to show how the high frequency current is used in the operation of obtunding sensitive dentine, to produce an analgesic condition of localized extent.

It will further show methods in use for treating pyorrhea, gingivitis, toothache from any cause, neuralgia, and abscess.

Electricity is diffused through body tissue with benign results, when in the form of the high frequency current. The tonic effect of electricity is secured when transformed into an actual spray incapable of causing shock. The erroneous idea still widely prevailing, that any electric current must have its danger, can easily be dispelled with the reasoning that any large body capable of harm is entirely changed when broken up into particles and is thereby absolutely robbed of harmful features.

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*Clinic at Lake Erie Dental Association, 1914.

No agency at the dental operator's hand provides such thorough all-sufficient qualities for the alleviation of pain as does the high frequency electric current. It is sedative to the needful area without being largely lost on other parts of the body, as is necessarily the case when a sedative medicine is administered by the stomach.

The current most fully affects that part with which it is in immediate contact, though it exerts a tonic effect to the whole member by the overflow or passage of the current through all surrounding tissue. It may be drawn through certain tracts by use of a sound. That is to say, the current can be quite strictly confined to a given path by establishing a medium of attraction as a terminal toward which it will travel in the course of least resistance.

Thus the high frequency current may be used with so large a range as through a single tooth from cavity to apical end, as well as throughout the entire alimentary canal. Distance is not a factor necessary to consider in directing an electric current from one point to another, but the path must be established. An electric current will travel a mile around rather than cut across a yard where there is no pathway. The density of tooth structure will confine the current induced within its body so that it can be drawn out opposite the apex by the operator holding a blunt steel instrument against the gum at that point.

This outline exploits the theory that its practice makes it possible to operate upon teeth at first too sensitive to touch with dental instruments. The clinic shows the uses of various forms of electrodes through which the current is carried from the generator to the parts to be treated, giving practical demonstration of handling patient who may be wholly unaccustomed to the use of any form of electricity on the body, or even needing to disabuse the mind of the common ill effects produced by other forms of electricity.

Cultivate Your P's

To those who would like to read a fine book on the self-help order, I recommend that they get a dictionary and read the letter "P." It is a rich mine of valuable success nuggets. Here are some of them:

Power, patience, poise, persistency, punctuality, perseverance, pluck, plod, purity, prudence, purpose, peace, principle, painstaking, push, plan, patriotic, pay, produce, perfection, play, plug, polite, polish, practical, profit, progressive, prompt, prosper, public-spirited.

Dig deeper and you may find more. The man who has these doesn't need to bother much about the rest of the alphabet.—*John Allen Murphy.*

THE RATIONAL USE OF THE SILICATE CEMENTS

BY CHARLES C. VOELKER, D.D.S., BROOKLYN, N. Y.

(Concluded from page 820, October Summary.)

Since the relation of individual experience is often of more real practical benefit to those who are seeking information on the use of a method or material in the practice of their profession, I shall give you some statistics compiled from my records and extending over a period of more than eight years, or since the first successful silicate cement appeared about 1905. The chief place for this material in my practice has been for relatively small approximal, buccal, labial and lingual cavities on the ten anterior teeth, and on the buccal and occlusal surfaces of molars and bicuspids; sometimes on the approximal surfaces of the latter. It must be borne in mind that the large majority of the fillings here reported were put in during the last five years. Before that time I was more conservative in their use, giving preference to porcelain, and the figures might be almost doubled had I used the silicates then as extensively as I do now.

On February 1, 1914, my records showed 690 silicate cement fillings put into the mouths of 232 different persons during the last eight and one-half years. Of these patients, approximately 200 have been under observation during the last three and a half years, permitting me to examine many fillings put in before that time. Of the total number of 690 fillings inserted since about the middle of 1905, there were about 66 refillings or repairs (about 10 per cent.). The number of repairs entering into this latter item, due to chipping, dissolution, discoloration or recurrence of decay around the margins, etc., was 22, or about 3 per cent. of the whole number of fillings, which leaves a percentage of total failure and subsequent replacement of about 7 per cent. of the original fillings. Of course, this margin of complete failures might be somewhat increased by the failures that undoubtedly occurred in the mouths of the thirty persons not examined during the period mentioned, of which number some can be accounted for. So it may be fairly stated that I have examined during the last three and a half years 80 per cent. of the total number of silicate cement fillings which I have inserted during the last eight and one-half years; that I have had about 10 per cent. of partial or complete failures combined after from one to eight years of use in the mouth, and about 7 per cent. of total failure after the same periods had elapsed. Some of these failures were due, I feel convinced, to orthodontic appliances which were placed over the fillings; and in many cases of young persons and even of adults, lack of care in keeping the mouth in a hygienic condition, in spite of careful instruction, was partly to blame. A natural tendency to caries and recurrence of decay, which appears even in well-kept mouths in which monthly prophylaxis is not carried out, may also be another cause of failure. I do not make these statements in order to palliate or excuse any carelessness or ignorance of correct manipulation on my part during the early use of the silicates, or to gloss over inherent defects in the material itself. But I do feel that the showing is a most excellent one and compares very favorably with other filling materials of general use today.

A most interesting thing to me was the length of time that elapsed in the cases of the 66 refillings or repairs between the date of first insertion and that at which they were replaced. It stands as follows: 5 refillings after the original filling had been one year in the mouth; 7 refilled after two years; 12 after three years; 16 after four years (this large number being partially due to several cases in which orthodontia was being carried on and perfect mouth hygiene impossible); 6 in five years; 8 in six years; 7 in seven years, and 5 in eight years.

During the whole period, I have to report only 5 deaths of pulps which I can trace to teeth in which silicate cements were used in very deep cavities which were left unlined.

Of the total number of 690 fillings, 544, or 78 per cent., were in approximal cavities, mostly in the anterior teeth, from the first bicuspids on each side, upper and lower; 74 were in labial or buccal cavities; 25 were in the occlusal cavities of molars and bicuspids; 23 were on the lingual or palatal surfaces of incisors and cuspids; 4 were in incisal cavities, and 20 were compound antero-approximal or postero-approximal contour-fillings.

I deem it only fair to add that I began the use of the silicate cements with Ascher's Artificial Enamel, continued with Ascher's Improved Artificial Enamel, and have used Ascher's New Artificial Enamel (a new product) from its first appearance in December, 1912. Since the latter part of November, 1913, I have also inserted about fifty fillings with de Trey's Synthetic Porcelain, and am awaiting an opportunity to make comparative tests of the two materials, as well as of others which have achieved prominence lately, under exactly the same conditions as to time of insertion, size of cavities, etc., in cases in which temporary cement fillings are indicated. Before closing I should like to read a few case reports:

Case 1. A young man, now 19 years old; under my care since November, 1905, when two occlusal cavities and one buccal cavity in the left lower first molar were filled with silicate cement. One of the occlusal fillings remained in place until January, 1913, or over seven years, and was removed then only because it was necessary to insert a compound amalgam filling due to decay having occurred on the anterior surface of the teeth. The other occlusal filling remained in place until December, 1913, or more than eight years, when it was replaced for the same reason as the other. The buccal filling was in good condition on January 1st of this year, after more than eight years and one month of continuous service.

Case 2. A young woman now about 23 years old. Under my observation since October, 1905. In June of that year another dentist had inserted two buccal and two occlusal silicate cement fillings in bicuspids and molars. Three of these are still doing good service, and the fourth was replaced with a gold inlay due to recurrence of decay after eight years. This patient has had 11 different cavities filled with silicate cement during the last eight and a half years, and only two of them have been replaced with the same or other material.

Case 3. A woman now 60 years of age. Almost every tooth has fillings. Rampant caries in spite of intelligent care on her part and fairly regular prophylaxis treatments. First silicate cement fillings made in June, 1907. Since then has had 10 inserted altogether. Two have had to be replaced after six and six and one-half years respectively.

Case 4. School principal about 40 years old. Two labial cavities filled with silicate cement in January, 1909. Last seen December 15, 1913. Both fillings in good condition.

Case 5. Young man now 22 years old. I inserted 10 silicate cement fillings for him between April, 1906, and April, 1907; two of these were on occlusal surfaces of bicuspids and are still doing service after nearly eight years. Two of the ten have had to be repaired on account of slight washing out of the fillings, and two have had to be replaced entirely.

Case 6. A young woman now about seventeen and one-half years old. . From June, 1907, until April, 1909, I inserted 7 silicate cement fillings, two of which have had to be repaired since, and one replaced with a porcelain inlay. Some of these fillings are discolored around the margins slightly and will be replaced soon with porcelain inlays or repaired with the newer silicates. The patient was not careful about prophylaxis until within the last couple of years, and she comes of a family in whose mouths caries is very difficult to control.

Case 7. A woman of 45 years. Caries rampant when she first came under observation; almost every tooth filled or crowned; extensive bridgework, making thorough mouth hygiene difficult; some pyorrhea. Not very careful about prophylaxis, and visits her dentist only about once a year unless suffering pain. Extremely nervous type. A silicate cement filling put on the right upper cuspid, postero-approximal cavity, in June, 1908; another in the right lower cuspid, same surface, in May, 1909. Both in good condition in May, 1913, after five and four years' service respectively.

Case 8. Physician about 35. Heavy smoker. I inserted 4 approximal silicate cement fillings from September, 1908, to September, 1910. Except from slight discoloration, which is true also of all his teeth, these fillings were in good condition in July, 1913.

Case 9. Young woman, now about 18. First silicate cement inserted when 10 years of age. Extremely nervous and difficult to work for. Developed indigestion and constantly in poor health due to errors of diet, principally the consumption of large quantities of candy and other unhealthful things. In hands of orthodontist for case of difficult regulation, which has already taken five years and not quite finished yet, due to temperament of patient. Not careful during first years of orthodontic treatment about keeping mouth clean. Since May, 1905, has had 18 separate cavities filled with silicate cement fillings. One of these has been replaced completely after seven and one-half years; four others have been repaired after two to four years. Two occlusal fillings will have been in place nine years in May, 1914. Two other occlusal cavities were filled in June, 1908, and are still intact. The remaining fillings have been in the mouth for periods ranging from two and one-half to eight years. This I consider a remarkable showing for silicate cement, because the repairs and replacements were undoubtedly necessitated in large measure by the orthodontia appliances, permitting food lodgment which caused secondary caries, and because of the youth of the patient and consequent negligence regarding mouth hygiene.

So I might go on detailing case after case, but this would entail needless repetition of results and conclusions. I wish, however, to give the following four interesting cases:

Case 10. Woman about 32. Not in very good health when first seen. On examination I found 27 cavities or broken-down fillings requiring replacement, and several abscessed or putrescent teeth. There were eight cavities which I thought might be filled with porcelain inlays, preferably, but might also be filled with silicate cement. The patient decided upon the silicate cement, with the understanding that the fillings were to be replaced with porcelain inlays as they became defective. These eight silicate cement fillings were inserted in December, 1908, and except for a slight repair of one of them in January, 1911, they are still in fine condition and giving perfect satisfaction.

Case 11. Young man, now aged nearly 23 years. Came to me in December, 1905, when about 15. Father had pyorrhea very badly; mother a poor set of teeth and very susceptible to caries. He was placed in my hands by the family dentist. I found 19 cavities in this boy's mouth, 10 of which were in the anterior teeth, approximal and adjoining each other in most cases, and mostly of such a large size that porcelain inlays were really indicated. It was, however, decided, after consultation with the family dentist, to fill with silicate cement, which was done in December, 1905. These 10 fillings were exhibited at a clinic under the auspices of my local dental society the following October, 1906, and they received critical examination and very favorable comment. I did not see the patient again for dental services for over five years, and when he returned in April, 1911, he told me that he had not had any dental attention in that time. Except for two small repairs where the fillings had chipped or washed away, they were in very good condition, showing only slight unevenness of the surfaces and some slight discoloration here and there around the margins. In the latter part of 1913 some of the fillings were replaced by a dentist in New York City, and when I saw the patient three weeks ago some of my original fillings were apparently still doing service, although about ready to be replaced, but none of the teeth seemed to have suffered from discoloration, and the patient was very pleased with the good results obtained with the silicate cement.

Case 12. This case illustrates one of those peculiar conditions which once in a while come up to baffle and to discourage us. The patient, a woman of about 30 years, healthy but of nervous temperament, presented with the right upper lateral having a small cavity on the antero-approximal surface. The tooth was very sensitive, but I managed to prepare the cavity and to insert a silicate cement filling on March 6, 1911. On May 8th of the same year she came back because the filling was loose and annoyed her when she used floss silk. I removed it, deepened the undercuts, although still very sensitive, and replaced the filling. In October of the same year, 1911, the patient presented again with a little of the filling chipped off, saying she had probably done it while using floss silk. It was repaired. This filling had thus been replaced or repaired twice within less than eight months after its first insertion. It lasted this time until June, 1913, when the patient presented with the filling practically all dissolved away. It was refilled this time with one of the newer silicate cements.

Case 13. The last case I shall report is one in the mouth of a member of my own family, and illustrates what is meant by the term "taking a chance." The patient is a young married woman who was in rather poor health when I first treated her on account of being in the early months of her first pregnancy. Has since been in very poor health at intervals. On July 16, 1907, I inserted a large compound antero-approximal-occlusal silicate cement filling in the left lower second bicuspid, in a deep cavity quite near the pulp, the tooth being so sensitive that it was necessary to line it with Pulpcap. The filling was contoured as would be an amalgam or gold filling. This has been under constant observation for seven and one-half years and when last seen in October, 1913, was still in good condition.

DISCUSSION.

The President: Gentlemen, we have had a treat this morning, a most comprehensive paper and one which I am sure we all appreciate very highly. Dr. Garvin is ill and unable to be here this morning and I will ask Dr. Amy, whose name appears next on the program, to open the discussion.

Dr. Amy: In the first place I wish to congratulate the essayist on his very comprehensive and I might say exhaustive essay on "The Rational Use of the Silicate Cements." It is all the more exhaustive because of the small amount of information on this material that has heretofore been given to us by the manufacturers or by experimenting dentists.

This essay of Dr. Voelker's is really the paper and discussion combined; it has left very little for me to say and what I do say will be but repeating what he has already said.

There are one or two things though that I wish to emphasize. The first is the mix. In experimenting that I have been carrying on lately I find that great care must be taken with the spatulation.

In cases where I believed I had been very careful in the mix I found that under the microscope the hardened mass contained many particles of undissolved powder; sufficient, I am sure, to spoil a filling in time.

The second is in reference to the use of the celluloid strip as a matrix. I use the strip in proximal cavities holding it against the lingual surface of the tooth to be filled, letting the strip extend labially and resting against the next tooth. I now pack the filling material into the cavity and against the strip forming the contour with my agate instruments. Drawing the strip across the filling is almost certain to spoil the contour except in very small cavities.

In gingival cavities it is very difficult to put on the rubber dam. In such cases after the cavity is prepared, dry out thoroughly, then coat the gum to the margin of the cavity with collodion; this will keep any moisture from oozing into the cavity.

I have had at times success with most of the silicates that I have tried and at other times the fillings have been discolored right through.

From the standpoints of color and permanence, I have had the best results from the use of De Trey's synthetic porcelain. Dr. Voelker in his paper advocated the pulling of the strip across the filling as crystallization was advancing. Now, at the point where I understand crystallization begins I would be afraid to pull that strip across the filling for fear of spoiling, and I believe if Dr. Voelker will examine a filling thus treated he will find it filled with fine lines showing that the mass has been broken. These fine lines will mean discoloration of the filling sooner or later.

Be exceedingly careful that all the instruments used are scrupulously clean, as you will find that even with the best of care the fillings under a microscope will show dark spots like dirt of some kind.

In closing I must compliment the essayist on the success of his clinical experience with the silicate cements. There are not many of us that can claim 90 per cent. of successes with this exceedingly erratic material. Many more of us could possibly vouch for 10 per cent. of successes and the 90 per cent. of failures.

These flattering results of Dr. Voelker's should be a stimulus to us to do the very best we can with even the most imperfect of materials. Gentlemen, I thank you for your attention.

Dr. Harold Clark: Mr. President and Gentlemen—I must first of all say that I have not been able to give this paper anything like the time that it deserves in preparing a discussion for it.

We are indeed most fortunate in having so timely a topic as silicate cements presented to us in so comprehensive and exhaustive a manner. If all other papers at this meeting were of mediocre interest, which of course is not the case, Dr. Voelker alone should make our convention well worth while.

Silicate cements are perhaps the newest feature of any large consequence in dental practice to-day and the need of the ideal filling and the hope that it is to be found in the silicate cement has led to an enormous use of a material that is really still in its experimental stage and such an intelligent presentation of the subject with so much of positive information in it should be available to all of us and save us from having many chickens come home to roost.

I heartily endorse Dr. Voelker's objection to the indiscriminate use of terms that are misleading to patients. An honest statement of the truth about the probable value of this filling will inspire the confidence of our patients and save us future embarrassment when these fillings prove to be less than ideal.

Right here I might indicate one or two uses to which I have put the silicate cement and found it thus far quite satisfactory:

First of all in cementing porcelain inlays where the form and size of the cavity and inlay permit it I make a V-shape groove around both the cavity and the inlay in such a way that the two grooves come opposite each other. I then use a rather thin mix of silicate to cement the inlay in place. The esthetic value is obvious.

The other use is fortunately one that is seldom called for. During the past year I have had two cases where a blow had broken off the incisal half or two-third of a central, leaving the fragment in one perfect piece. I cemented a flat iridium post into a carefully made slot in the fragment. When this was ready to cement in place I mixed both oxyphosphate and silicate cements. I first put the fragment in place with oxyphosphate and immediately withdrew it and wiped away the cement from the labial joint and replaced it with silicate and inserted the piece. The result was that at speaking distance one would not even see the line at the joint.

I have to confess that since the advent of the silicate cement it has with me taken the place of many a porcelain inlay during the past four years and while for certain classes of cavity it has come to stay, I have experienced a glad return to the porcelain filling.

Regarding the influence of these silicates upon the vitality of the pulp I am convinced that they are rarely responsible when blamed for its death. In the vast majority of cases the pulp would have died no matter what filling was used. It is like the man who went into the water on Sunday and was drowned. Busybodies said it was because he had gone in on Sunday. Any other day it would have been because he couldn't swim. The real reason for the pulp death is that it has been infected or infected tissue has been under the filling or the cavity has encroached too closely upon the pulp. I might say that practically every cavity I fill is first lined with a coating of varnish I make myself. Most of you here know of it. It is composed of Canada Balsam and dissolved in Chloroform. The Canada Balsam makes it very adhesive and it fills the tubules with a bland non-irritating coating that in my experience is very valuable.

Before sitting down I would like to ask Dr. Voelker to outline his system of keeping his records. It would take a vast amount of time to gather such information from mine. I also want to say one other thing—When I go to listen to a symphony I always like to have the "score" with me, and I think it is a great improvement when listening to a paper such as we have had, to have the "score" in our hands so that we may follow it. In future, since these papers are going to be published in our journals, it will certainly be an excellent thing if we can arrange to have this repeated. I thank you.

The President: The meeting is now open for general discussion. Don't waste any time, gentlemen.

Dr. Knapp: How would you repair the porcelain fillings that are chipped off the side or corner? Another point, what class of fillings would you reject in filling with silicate cement? Another point, I might give an instance, a boy came in with an upper anterior that was abscessed, a fistula that was a very dark color; the labial wall was intact and it was treated and got healthy and filled with silicate cement. That was perhaps a year ago and it looks now as though the filling had the effect of bleaching the enamel; at any rate, it was very decidedly lighter than it was when it was filled.

Dr. Husband: Following up that remark by Dr. Amy about him not understanding Dr. Davis' procedure in patting the filling, I would like to ask Dr. Voelker if he has had any experience as to the finished product by pressing it with the strip or patting it. Dr. Davis in speaking of finishing the filling spoke of making little foot-shaped plugger, perhaps of iridium or platinized gold. He claimed this material didn't come off of the surface of the filling, wasn't acted on chemically by the action of the cement, and in finishing the filling he would set these little points along on the proximal cavity, with a pin in a little cork and he would use this little cork just to tap with his little mallet, of which the foot would rest on the filling, and he would bring that filling material to that consistency which he got when he patted the little mix on the slab. Dr. Davis claims that was the proper way to finish that filling, not to use the pressure on it, but do a little tapping motion with the foot plugger. It brought up the shade to a polished tooth surface and that was allowed to set before it was touched with a disk.

The President: If there are no further questions I will ask Dr. Voelker to close the discussion on the paper.

Dr. Voelker: Dr. Amy brought out first of all the question of the secrecy that is observed by manufacturers in not giving the details of the composition of their powders or the technical methods used in its manufacture. That is a case where this action that you have taken this morning will tend to do away with a lot of secrecy; it will give you a chance through your research workers to take up these various products and find out for yourselves what is in them, because then you will get the facts unbiased. I do hope that with this question of research under the auspices of the National Dental Association in the United States and the work Dr. Kirk is doing at the University of Pennsylvania—I understand they are going to have a large sum set aside for that sort of research work every year—will give us a better insight into a great many things that at present we know very little about. I believe of all the things we use we know the least about cements. Manufacturers know a good deal more than we do.

In regard to what Dr. Amy said about this paper being comprehensive. The subject is so big and there was so much to learn that when I dipped into the literature of this matter and found out how much there was, I almost threw up my hands. This is really only a beginning. If I have the time I want to go into the matter better and more in detail, physically, chemically and microscopically. Thirty years ago if it had been said we would have been able to have a product at this time that was as good as the present silicate we would have been laughed at; and who knows but that thirty years from now we will have an ideal silicate filling. I remember Dr. S. G. Perry, of New York, once saying that he hoped to live till he saw just such a condition as this. He lived to see the filling that approached toward the ideal. At the time he spoke about this they had nothing but gold and amalgam, and were just beginning to use porcelain.

Remember, gentlemen, these silicate cement fillings are only semi-permanent. That is probably a bad term to use; but I want to emphasize that they are not permanent fillings. I look upon them simply as—what shall I say?—not exactly make-shifts—but they preserve the tooth and keep you from having to make gold fillings; keep you from cutting away sound tooth structure as you have to do to make any size of gold filling or porcelain inlays. In my practice I may say that in the last eight and one-half years I could count on my fingers of both hands the number of gold fillings I have put in the front of the mouth. (Applause.)

Now regarding the death of the pulp. That figure of five deaths of pulp I think is not too conservative. I don't believe I have had more than five deaths of pulp that can be attributed directly to the use of silicate cement; and, as I said in the paper, it was generally my own fault; I should have taken those pulps out first. But I do know that one of the most prominent dentists in the city of New York, a man whose practice is not exceeded by any other in the United States, let it be known that he has never had a death of pulp from a silicate cement filling. It is a question of the man behind the gun. It is a question of using them where they are indicated; and that brings me to that other point Dr. Clark brought out. Not long ago a patient came to me, a new patient, and after doing quite a little work, gold inlays and so on, I found that on the right upper first and second molars he had two enormous silicate cement fillings which were badly discolored; they had been put in four or five years ago by his family dentist, who had died. The patient was a man about thirty. I took out both of them. One was a posterior proximal cavity on the right upper first molar and fortunately the pulp was not dead, although there was considerable decay around the filling. I took the other one out and underneath it I found a putrescent pulp. I treated the tooth, but the palatal canal I couldn't get dry. I had an X-ray picture taken and it showed the palatal root extended up into the antrum. The whole antrum was infected; and the patient is now under the care of a rhinologist to overcome this. I filled the root canals; but it may be necessary to operate on the antrum; and I attribute that directly to the use of the silicate cement, where it had no business to be used in the first place.

Now another thing I feel we ought to understand thoroughly in justice to the product which has really been the means of giving us this improved material which we have today for filling these cavities in the front teeth where they show; and that is that I consider Ascher's New Artificial Enamel is a new product. It has been on the market only since December, 1912; and the conditions of manufacture have been so changed that it will bear comparison with any of the new ones. The fillings I passed around to you were made with two of the products that are now so prominent. One of the teeth was filled with Ascher's and the other with Synthetic Porcelain.

In regard to that other question about when the chemical action begins. From a chemical standpoint, if you use a liquid containing phosphoric acid and you have a powder which combines basic oxides and silicates, if you add acids to those basic elements I don't see how you are going to prevent having an action immediately. It must take place as soon as we get the elements united. If you add an acid to a base you have the formation of salts and it begins at once with the development of heat and other changes that may occur.

As to the use of the strip, I think Dr. Amy's suggestion is very good, to hold the strip between the teeth and pack the cement over it. Personally, I don't often use a strip. I brought it out because it seemed to me a very good point. What I wanted to bring out particularly was not to burnish over the strip, but get your material into the cavity, pack it to your margins, then add the center and pack that down. It has got to be done very rapidly. The use of the strip all depends on circumstances. You have to mix one kind of silicate cement a little stiffer than another kind and you can use your strip with the cement that is not packed in quite so stiff.

As to the percentage of failure, I think that the percentage I gave is fairly representative in my practice. I went over my records quite carefully. I see these patients when they come in and I examine their mouths; and those cases that I gave you are simply taken at random. Some of them I took because I had put in a large number of silicate fillings and I wanted to show you how they held up; but I believe it is all in the question of where they are indicated. That is the important thing. Don't abuse the material. It is the abuse of these things which leads to their non-use and trouble afterwards.

As to my records, I use the card system. I start with my patient's name, address, recommendation, telephone number and various other data on top; the date of each operation is noted under the "date" column. Then I say "left upper lateral," L. U. Lat.; anterior proximal, A. P. If I use a synthetic cement filling I put in "syn;" if it is Ascher's, I put in "Asch;" then I note the time; I always put down the time in the chart, although I do not charge either for the filling or the time, but for the service I render. When I have finished that card, if I have not completed all the work on the first card I begin another card. The records run back on these cards to the beginning of my practice. And when I want to get these data I look back on the cards.

In regard to these repairs that one of the gentlemen asked me about—What do you do if you break a side or corner? I suppose he had in mind a contour corner filling in the anterior teeth. I don't use silicate for that purpose at all. I use porcelain inlays for all corner restorations in the front teeth and I put in about as many porcelain inlays as I do silicate cement fillings.

Dr. Knapp: I meant in repairing them.

Dr. Voelker: You mean in a cavity which does not extend down to the incisal edge? Sometimes they seem to chip. I don't know why. I simply apply the rubber dam and cut out a little and repair it, as I would any cement filling. I don't use the silicate where there is much contour, although I "take a chance" once in awhile to put them where they are proximally adjoining each other; but you are bound to have them come back in a year or so with part of the filling washed out because they can't bear the stress of mastication. Yet on occlusal surfaces it is wonderful how they will stand up. I have had them in place eight or nine years and they look just about the same.

Dr. Mason: You never use them to restore a contact point?

Dr. Voelker: Yes; and if Dr. Hillyer were here he could tell you about two of them in his son's mouth that he put in several years ago still in good condition. They do dissolve off and do become destroyed, but many of my patients are willing to have them replaced rather than have the gold there; and if they are willing to have them replaced when needed, I am perfectly willing to use the material under those conditions.

As to this question of patting or pressing the filling into shape to bring up the shade or translucency, I have just read Dr. Davis' paper, and it is something I know nothing about. It does not seem as though a plastic filling can be put in by the aid of a plugger.

Dr. Husband: After it is finished.

Dr. Clark: It is the same process as in laying a cement walk.

Dr. Voelker: The only thing to me would be that if the cement has started to crystalize—and I believe crystalization begins very soon after you have made your mix—you are apt to break up your crystalization. It depends on the product that is used. I wouldn't want to try it with Ascher's New Artificial Enamel nor with the Synthetic Porcelain.

A Member: Dr. Davis was speaking of de Trey's synthetic compound, and he defended the use of the mallet; but would not that tapping or malleting have a sort of jarring effect?

Dr. Voelker: It is something I have never tried and I wouldn't care to express an opinion before I have tried it.

Dr. Wunder: I have never heard of anyone else using a very, very thin strip of aluminum on their silicate cements, and I would like to know what effect that would have on the chemical composition of the fillings?

Dr. Voelker: I am afraid you will discolor your fillings. You know there is free acid in a silicate filling sometimes as much as 24 hours after it is filled. When they brought out Archite they flooded the market with cards containing various shades, and several months afterwards they were tested for acidity and there was still acid there. You take a metal that is soluble by phosphoric acid and you will get a little bit of that deposited, and electrolytic action may be brought in through the medium of the acid salts and you would surely have discoloration.

Dr. Wunder: Aluminum salts are usually white.

Dr. Voelker: That may be, but if you get a soluble salt and sulphides in the mouth you might get discoloration. In other words, it is not safe. We ought to eliminate every factor that does not make for safety.

Absence of occupation is not rest,
A mind quite vacant is a mind distressed.

FROM THE BORDERLAND OF MEDICINE AND DENTISTRY

BY HERMANN PRINZ, A.M., M.D., D.D.S., ST. LOUIS, MO.

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(Continued from page 801, October Summary.)

DISCUSSION.

Dr. W. H. Whitslar: Our distinguished visitor has presented to us an elaborate and learned address. It is replete with history and examples of relationships between the teeth and the body. He has also told us of the co-relation of the medical and dental professions. Any or all of these subjects are capable of being useful for discussion. Indeed, I am sure Dr. Prinz has in his own mind only touched upon some of these topics, and has brought them here tonight from the borderline dressed in their swaddling clothes. Might I ask, "Where is this borderline?" To be seriously practical I wish to indicate the thought that the real borderline is the peridental membrane which supports the tooth in its socket. The tooth itself might be likened to a tactile corpuscle in the skin, the fine threads of nerve tissue in the pulp being the out-posts or sentinels and the enamel representing their clothing. The tooth pulp is the signal station that notifies King Health that enemies are lurking amid the environs, and the teeth represent a standing army to guard against the ravages of disease. They become also the battlements to resist attacks. If weakened by constant grilling these give way. Artificial Repair, Dental Surgery, is employed to restore the breaks without, and Nature employs the odontoblasts within to make internal repair with sacks of lime: If all these means do not avail, General Vital Force is kept continuously at the front to maintain the life of the tooth. Periods of fretfulness now ensue. Sharp Winter with his icy pangs brings suffering and the out-posts receive scant assistance from General Vital Force, who has retired because of lameness. Overwork and poor food result in neurasthenia and sooner or later death results in an unostentatious way, or, mayhap, in a few gasps. The life history of the pulp is shorter when the external battlements do not receive surgical interference, and its exposure is followed by the invasion of countless organisms. A whirl-wind of attacks now commences. At first there is a slight grumbling, then lightning crashes occur; the teeth, the eyes, the ears and finally the brain as well as other parts of the body are affected. These may receive anodyne treatment from the physician but it remains for the dentist to discover the true diagnosis and shoot the dying victim with cocaine or poison him with arsenic.

The funeral procession is now hurried with barbed hooks in fiendish glee, and the empty sepulcher is closed with gutta-percha to await the Day of Judgment. Blessed be ye dentist who does not have to open these sepulchers again, but, alas! Microbe secreted himself with some of his followers, Ptomaines, in the cavern of death and cannot escape. The Day of Judgment comes unannounced as promised, for the sepulcher doors do not loosen and Microbe tunnels through the small foraminae at the root end, is nursed to life, and multiplies in number. Again we witness another battlefield. The banners of the Phagocyte appear and walls of defense are constructed. All fight to exhaustion. Sly old Absorption now comes sneaking around and carries captive into the circulating fluids the poisoned fighters and their ammunition which disturbs Human Economy even unto death.

In his efforts to combat the sequences of the aforesaid battle, the physician finds blood-poisoning, necrosis of soft and hard tissues, indigestion, kidney diseases, neurasthenia, paralysis and dementia, the result of dental disturbances which have arisen in the pericementum.

This is further evidenced in the suppurative processes of the peridental membrane which have been commonly grouped under the name of pyorrhea alveolaris.

Time does not permit me to go into the etiology or pathology of the different phases; suffice it to say that the field for investigation has been wide open for hundreds of years, and it has not been definitely surveyed to enable the making of a correct chart. We might examine this field for a moment. It has four corners. We start, or should start, in one corner to lay the lines, and plant a stake, and call it Prevention. Had this stake been driven early enough it would have pre-empted the whole claim. However, Cause appears to drive another corner stake, and Disease another, and the last is anchored by Death. Each corner has its devotees, and, if in the corner of Prevention it has an overwhelming number, we shall not look for other landmarks. On the other hand, observe the dentist who neglects to call attention to an existing pyorrhea, and he contributes negligence to his patient, and the whole category of sequences. This may begin as a septic gastritis, and lead to septic enteritis, appendicular, pleuritic, gall-bladder, and pyelitic inflammations. Dr. Hartzell reports three deaths due to septic endocarditis traceable directly to virulent pyorrhea. Dr. John B. Murphy cites cases of rheamatoid arthritis, so-called, due to alveolar suppuration. The dental profession has never before been so alive to the fact that this is a preventable diseased condition.

All alveolar inflammations are encouraged by autointoxications and the manifestations accompanying them, such as gout, uric acid disorders, arteriosclerosis, etc.

Tuberculosis and syphilis play important parts in many cases which baffle treatment. Oral sepsis is commanding today the greatest respect of every intelligent physician and surgeon. Only a few years ago, upon my recommendation, a lady concluded to have some teeth extracted, and others treated and filled, which saved having an operation upon the stomach made by a surgeon of repute. To my astonishment, the surgeon had not examined the mouth. It is, in my opinion, as important to prepare the mouth previous to operating upon any portion of the alimentary canal as it is to scrub and clean the abdomen before the incision is made.

In the foregoing I have endeavored to intimate the professional relationships of the two professions occurring in the purpose of assisting humanity. Dr. Evans, of Chicago, has intimated to us that the physician if he knew more about dentistry would be a better physician, and that the dentist would be a very much better dentist if he knew more about general medicine.

The borderland, as you see, is the Peridental Membrane where the larger landscape becomes evident with its absorptive rivers flowing by, and the loss of epithelium exposing the whole body to grave dangers.

The dentist seeks to know more and more of the operations of the body to distinguish its morbid changes, and welcomes assistance from the medical practitioner. Especially is this true when physicians refer syphilitic and tubercular patients and notify the dentist of the presence of specific troubles as these are not always recognizable, even to the experienced eye. Likewise, the medical profession are recognizing the assistance of intelligent dentists as aids in their diagnosis. Not only the teeth, but their contiguous parts will provide aids in diagnosis that must not be overworked. The saliva will soon be recognized as valuable to diagnosis as the urine. The late Prof. Michaels, of Paris, has demonstrated this statement without attempts to deny its value. The late Prof. Miller, of Berlin, also left a heritage of valuable material to assist in the problems of dentistry. Horace Wells, a dentist, proved to the world the discovery of anesthesia, the greatest boon to humanity. The use of cat-gut for sewing up wounds was the discovery of a dentist and other valuable aids have been the work of our dental brethren. Only last Friday evening in Chicago, Dr. Charles H. Mayo, the noted surgeon of Minnesota, read a paper entitled "The Relation of Local Foci of Infection to General Systemic Conditions." This indicates that the medical expert has recognized the relations of oral conditions to the whole body. In deed, the time has arrived when the call of the human race for better treatment will co-ordinate the professions in their labors. This is well understood and accepted among the advanced thinkers. Personally, I feel grateful to Doctor Prinz for his scholarly paper read tonight. He is regarded by the dental profession as one of its foremost scientists, and always presents more than one can digest at a single hearing. In the future we may have to look to him to unravel some of the chemical and pathological mysteries that are before us every day. We do not want prophets, but real chemists and pathologists in which class Dr. Prinz belongs. I hope we shall soon see the establishment of laboratories for scientific investigation of all dental questions.

G. N. STEWART, M. D.: First, let me say how extremely I appreciated, so far as my necessarily limited technical knowledge of dentistry allowed me to do so, the able address which Dr. Prinz has made us. In particular, to begin at the beginning, I appreciated his title. I believe profoundly in the cultivation of borderlines and borderlands. They are not by any means narrow, barren strips. It is between the great sciences as we find them divided today that some of the most fertile territory exists. I am extremely glad to know that Dr. Prinz is cultivating borderlands.

A little bit farther on in the address there came a passage which also interested me very greatly, the passage in which Dr. Prinz cited the opinion of others, supported by his own most weighty opinion, that it is injudicious at this time of day for dentists to have to qualify themselves for the exercise of their profession by taking the whole medical curriculum. I entirely agree. I know that there are exceptional circumstances in which it may be permissible and in which it may be advisable and highly advantageous for a man who intends never to do anything else than dentistry to take the M. D. degree, but upon the whole I agree entirely with Dr. Prinz that that is not to be in the future any more than it is at present the noraml and ordinary way of entering the dental profession, nor is it desirable that it shall become so. The best way, and it will become, I think, the normal method in some other medical specialties, as soon as they are as definitely differentiated as dentistry in the eye of the public and in the eye of the profession itself, the best way, I say, in regard to a certain number of specialties will be found to be that men who from the beginning lay the broad and solid biological foundation which Dr. Prinz has referred to, should with clear purpose beign to build upon that for their special work. Undoubtedly, in dentistry you need a broad biological training; a part, and a very important part, of which can be obtained in the study of clinical medicine. But you need, from the beginning of your studies, to keep in mind the brevity of life and to select the things, not only the facts, but, what is far more important, the lines of biological thought which are going to be most important to you. For example, as Dr. Prinz has already said, why in the world should the dentist know the minute anatomy of the whole human frame? He knows perfectly well that he is going to be a dentist at the start; his father sends him to college to be a dentist. It is very well that a man who doesn't know exactly what he is going to do later on, after he has practiced medicine as a general practitioner, but who thinks that perhaps after awhile he may go into surgery, should study the whole anatomy of the body; but the dentist is quite sure from the beginning that he need not know most of that.

Physiology is on an entirely different foundation. I allow myself to say this because for eight years I filled the position of professor of physiology in the Dental School of the Western Reserve Medical College. I see here a large number of my old pupils, most of whom I trust have entirely forgotten any little scenes that may have occurred there. I hope, in particular, if I may digress, that that is true in the case of the gentleman who once answered my question—I see now that it was the finest irony, though at the time I thought it was ignorance—on the process of deglutition. He said the food was taken into the mouth, masticated by the teeth, gathered up into a bolus on the tongue—I hope there are no waiters here—and then—note the enormous transition, the infinite transition—by a sudden suspensory effort, it was expelled from the anus. (Laughter.) I think, as I say, that that gentleman was and still is, a master of irony. What he meant to say was this, unquestionably: 'I am to be a dentist. I have a great interest, indeed, in the preliminary processes of digestion, mastication and the apparatus for mastication interest me immensely. But for heaven's sake what have I got to do with peristaltic movements of the stomach and the intestines, and with the pendulum movements and the peristaltic rush and with Auerbach's plexus and Meissner's plexus, and with the whole thing down until this bolus, (laughter and applause) by a suspensory effort, a sudden suspensory effort, is expelled from the anus? How am I concerned with that as a dentist?''

At the same time, I hope that I am not talking shop; I am no longer a physiologist, I have forgotten most of what I ever knew in that particular, and that may be my justification—you need a great deal more of physiology than you do of anatomy, and you need the best kind of physiology, because, for instance, it is just the same laws exactly which govern the circulation of the blood elsewhere that govern the circulation through the gums, or through the dental pulp. If I may be allowed to be slightly reminiscent, the first year that I had dental students to teach I gave them the same course as the medical students got, and I found it unsatisfactory for this reason, that while the dental students, in my opinion, required the same quality of physiology that the medical students required, they did not quite require the same quantity; they did not require the special physiology of certain functions, while that of many others they did require. The problem of refraction in the eye has little contact with dentistry. Who would be bold enough to say that the physiology of the adrenal glands of the thyroid or of the pituitary would be superfluous for the dentists? I do not think that I need to go into the other branches of the medical curriculum. You need some pharmacology, which must be of first-class quality, but you do not need to exhaust the whole pharmacopoeia. For example, you are not particularly interested in the great group of antipyretics. The same with pathology; you are not particularly interested in the special pathology of a great many of the organs. In the case of hepatic cirrhosis, you don't care particularly what has happened there either in the lobules or between them. You are interested, however, just as much as the medical profession, in general pathology, in the great process known as inflammation, in the fundamental meaning of that process. Inflammation of the mouth is just the same in its essential character and significance as inflammation anywhere else. I have chosen to speak about one or two points that I happen to know a little about, because there are such a vast number of things mentioned in Dr. Prinz's admirable paper on which I have no right to speak, and therefore I have saved my face by talking about this not unimportant matter, I hope, of dental education, and a matter in which I have the honor to agree entirely with Dr. Prinz.

One other little thing I should like to say before I stop, and that is what an admirable impression your present meeting must make upon those members of the medical profession, who, like myself, are present for the first time at a meeting of the Dental Society. Take your plan of dining. When I asked your President, ''How does it happen that you have such a large and representative audience?'' he touched a plate in front of him. That is quite true, that is excellent insight, and I think it is a procedure that might be very well tested by the Medical Society.

I thank you, Mr. President, for not cutting me short. I am afraid I haven't quite done justice to my hard-won—and it is hard won, in a way—reputation, such as it is, for brevity.

George W. Crile, M. D.: I have listened with unusual interest and profit tonight to the scholarly and comprehensive address of Dr. Prinz. And long before he had finished his paper I realized that the borderland between general medicine and dentistry is surely as profitable and I daresay more profitable to the practicing physicians than to the practicing dentists.

I would like for myself to say a word about some of the relations that I have observed between the work that I have to do and the problems that the dentists have to meet. We have, of course, first of all, in surgery, to consider the many infections that arise from the teeth; the many abscesses that we have to open; the many lymphatic glands of the neck that are inflamed and go to abscess; the many cases, I take it, of tuberculosis that gain their port of entry through the teeth; and we find also, I am sure, the danger in the bad asepsis of the mouth, the dangers from certain infections in the mouth, in giving anesthetics. I have the impression, especially when one gives ether anesthesia, that a mouth in a state of bad hygiene would produce a large amount of infected mucus, and that, being inhaled, may, and I think often does, produce bronchial pneumonia and what is called ether death.

Then again, when we have to do an important dissection in the neck, which has to be aseptic, it is of great importance that the teeth and the mouth be put in a good condition of hygiene. And the same is true when one performs an important operation upon any part of the upper gastro-intestinal tract. When one operates on the stomach, or the duodenum, it is very important to have the condition of the mouth as sanitary as possible.

Not only in the immediate effect of operations do we find it important to depend upon the dentist, but we also find that we can trace to the teeth an immense number of diseases with which we must cope. Most of these have been mentioned tonight, and I wish to confirm, as far as I can, the views given by the distinguished essayist on the relations between certain diseases and the health of the mouth. I am sure that a great many cases of gastric and duodenal ulcer take their origin in the infected mouth. I take it that a great many cases of myocarditis, a great many cases of obscure infections, even of the kidneys, take their origin in the infected mouth. And for myself I am free to say that the more I reflect on the mouth in its relation to the infections of the remainder of the body, the more I am inclined to put weight upon that great source of infection.

Now, it is so true that the patient with an unhygienic mouth, with a chronic infected mouth, with bad and carious teeth, is so much more prone to all these various types of infection that I have mentioned. Therefore I think it is more and more important to have the co-operation of the dentist in meeting the problems of surgery. For example, there are a certain number of operations that I do not undertake until I have referred the patient to a dentist, to go over the mouth and go over the teeth, and then allowing a few days to elapse before the operation is undertaken. And I think, before the time that I was aware of the importance of this matter, that I had seen serious complications following operations, and I might say death following operations, from infection, when, by the simple cleansing of the mouth, the simple putting of the mouth in an aseptic or nearly aseptic condition, this is entirely obviated.

Now, passing by, very briefly, the many things that I might say about the relations of the infections to surgical problems, I would like to refer to another matter, and that is the relation between the texture of the teeth, and the mental state, the psychic state, of the patient. Am I right in believing that grief and sorrow and strain, if continued over a period of time, result in the decay of the teeth; that these conditions result in a change in the saliva, and that in one way or another these psychic stages, these changes of life will actually cause great changes not only in the teeth but in the neighboring tissues? In exopthalmic goitre there is a very great tendency to decay of the teeth.

For myself, I can only say that I have been placed under many obligations by my colleagues in the dental profession, from whom I gain a great deal of valuable information, and I hope that from time to time I shall have the opportunity of receiving still further viewpoints from the dentists. I have learned much from the paper of Dr. Prinz, for which I am duly grateful.

Hamilton F. Biggar, M. D.: I would be grateful, indeed, if I could say how much I have enjoyed this meeting, particularly the masterful, scholarly and practical address of Dr. Prinz. It has been to me an education, and I have been much interested.

I have been impressed that the oral cavity, with its adnexa, has been of great assistance in the diagnosis of many diseases of the different organs of the body, whether of the brain, of the chest, of the procreative organs or of the organs of digestion. There will be observed the prodromata, the very beginning, the keynote symptoms. Is it not true that when a case of Glosso-labio laryngeal paralysis, that is bulbar paralysis, presents itself for examination, the above symptoms are first manifested in the tongue, in the lips and palate? I was also impressed with the importance of dental hygiene, how necessary it was for the health of the body. All of which have been alluded to by the essayist and those who have followed in the discussion.

The essayist referred to the use of potassium chlorate, and the dangers from its constant use. I have asked dentists what is the best means for purifying the mouth, and have received as many different answers from as many different dentists. One says nothing is better than pure water, another says nothing is better than a weak salt solution, and another says the bicarbonate of soda.

The topic has been ably presented, and ably discussed. One of the speakers has referred to the harmony that prevails among the members of this dental association. I believe it has been uplifting not only to the members of the dental profession, but also by association to the members of the medical profession. It is within my time that scraps were of frequent occurrence among the dentists themselves, and it is also within my memory when strenuous arguments were in evidence even with the medical doctors, such formidable scraps that the referee would be compelled to say, ''Break away, back to the corner,'' or direful results would follow. (Laughter.) You have comparatively none of those now; if you do, I don't hear of them. And it is praiseworthy that you should in other ways strive to elevate the profession, as you have done, and have proved so successful in its uplifting.

When I was a lad, I was a victim of the earlier practices of the country doctor—every doctor in those early days extracted teeth—who unnecessarily pulled the aching tooth with that instrument of torture, the turnkey, an instrument I think similar in its use to that used for turning saw logs. Its mechanism was to pry the tooth out, and the poor patient was tortured worse than the pangs of hell. Which reminds me of Burns' ''Ode to the Toothache,'' evidently a sufferer himself:

''Adown my beard the slavers trickle,
I kicked the wee stools o'er the mickle,
Around the fire the giglets keckle,
To see me loup;
While raving mad, I wish a heckle
Were in their doup.''

The evolution of dentistry has changed matters considerably. The dentist now fills your teeth without pain, in fact, it is almost a joy to be in a dentist chair. Instruments have been devised by which you can have a cavity filled or the nerve of the root removed without any severe degree of pain. Truly the evolution is great.

I think, however, that there should not be any borderline between the medical and dental professions. A dentist should be a physician, and the physician should know all that pertains to dentistry, with the exception of the mechanical part. The medical profession has one advantage over the dental. The dentist may cause a lot of suffering to the patient which may be overlooked, for the time, when the bill is presented. For sometimes the amount of the bill is a disturbing element and harder to bear than was the pain that the dentist inflicted. In medicine it is different; if you cure your patient he sings your praises, and if you do not, there is preserved a dead silence. (Laughter and applause.) I do not want to appear profane while telling you of the pleasure I have experienced by being present this evening, should I use the phraseology of Mr. Grady, the editor of the *Atlanta Constitution*, when leaving a very pleasant reception in Boston. And I trust that your sentiment will be in accord with that of a reply of the hostess to Mr. Grady. Mr. Grady was invited to lecture in Boston and they were so delighted with his lecture that he was invited to a reception by one of the aristocratic families on Commonwealth Avenue. When at the close of the function he was about to pay his respects to the hostess, she said, "Now, Mr. Grady, do not say anything conventional, do say something unconventional." Mr. Grady straightened up in true southern chivalric pose with his hand over his heart and said, "Madam, I have had one hell of a time." The hostess rose to the occasion and in reply said, "I'm damned glad of it."

DR. W. G. EBERSOLE: The title of the paper this evening is "From the Borderline of Medicine and Dentistry." To one who in early life, when contemplating prepartion for a professional career thought that medicine and dentistry were so closely related that, though pretty well along in years, he decided to take a full course in medicine in order to prepare himself for the practice of dentistry, it is not surprising that such a man believes that there is no borderline between dentistry and medicine. The experience of later years has gone to prove the judgment of earlier years, and notwithstanding the statement of the first gentleman who spoke in discussing this paper, I wish to repeat the statement, there is no borderline between medicine and dentistry. Those of us who are assembled here tonight, and I believe I include the medical men as well, came to learn of this great man in our profession, what his views were or are of the borderline between these two great professions. When I read the introductory to this paper, I was impressed by the foundation which he laid in going into history; and when we came to the discussion of the diseases which he described as being on the borderline, I was again impressed with the idea that this man was going to give us something that would point out a line, a borderline between these two professions; and as an unbeliever in a line I expected something that would give us an opportunity to judge or discuss the question in a broader way. Judge of my surprise, however, when the paper ended, to find that no conclusion had been drawn from this paper upon which we could base an idea of the dividing line between the two professions.

I have made the statement that there is no borderline between medicine and dentistry. On the other hand, I wish to make this statement, that there is a definite borderline for the physician or surgeon and for the dentist. And when I speak of the physician or the surgeon or the dentist, I am speaking of the individual. These two statements may seem inharmonious, that there should be no borderline between medicine and dentistry, and yet be a borderline for the dentist and for the physician. Let me explain what I mean by the last statement. To the dentist who sees and knows nothing but the tooth, the borderline for that man ends at the peridental membranc, as stated by one of the speakers. And for the man who knows the tooth and the contiguous tissues, understands and treats the teeth and the surrounding tissues, the borderline for that man lies where his vision ends. On the other hand, for the physician who fails to consider, or take into consideration, at least, the influence that the human mouth has upon the general welfare of mankind, who sees or knows nothing of the influence that abscessed teeth may wield, that man's borderline ends with the extent of his knowledge.

In Dr. Prinz's paper tonight, in the history he gave us, he delved deeply into the past, and in the description of the various diseases and their treatment he touched upon the present. That which he would have us understand of the future, we can only draw by inference. The past is but a memory, the present but a fleeting moment, the future deals with all eternity. We are gathered tonight, I take it, for the purpose of learning of this great man something that will benefit us in the future. And I had hoped to hear from this man's lips, and hope yet to hear from him, what, through his knowledge and vast study and research, he believes to be the future borderline for dentistry and medicine.

There should be no borderline; there is no borderline; there can be no borderline, if medicine and dentistry are to do for the public their full duty. With the human mouth thoroughly understood, and the relation that mouth hygiene bears to general hygiene of the body fully recognized, this statement will be found to be true—and, by the way, in that connection I wish to say that I had the pleasure of listening to the paper read in Chicago by Dr. Charles Mayo last Friday night, and that carries me back to what I said with regard to the borderline of dentistry and medicine—this man spoke of the various diseases that they had proven to be connected with dental lesions. Dr. Crile touched upon the point that myocarditis, endocarditis, arthritis, might be influenced by dental lesions. This man made a definite statement that they had proven beyond any question that cases of arthritis, endocarditis, pleurisy, renal disturbances, etc., examined in their laboratories, contained the same micro organisms that were found in abscesses situated around the teeth. There might be a question arise in connection with that fact; some one may ask the question whether or not the tooth condition was responsible for these conditions, or whether or not the tooth condition was a secondary affair. In answering that question it might be well to say that this man made the statement that these conditions would not respond to treatment until after the oral conditions were rectified and changed.

Dr. Stewart raised the question of what the education of the future dentist and even the medical man should consist of, and I think he touched upon a very vital point. I believe that in the future all specialties of medicine will give two years, possibly, to the study of biology, that the student will select, as Dr. Stewart suggested, the specialty that he expects to follow during future life, and after a time devote the rest of his study, the rest of his college career, to studying and preparing for the treatment of a special disease or special organs of the body. Dr. Prinz, in his paper, spoke of the divorce of medicine and dentistry in 1839. I believe this to have been a mistake, and I think that all of us, when we study the matter, will come to the same conclusion. These two professions have never been happy, and have never fulfilled their full duty to humanity because of this fact, and they will never do for humanity that which humanity has a right to expect from these two great professions, until they are again united.

I have, I guess, spoken over my time. I am very glad to have had the opportunity of discussing this paper, and I wish to say to you and to all those present, and to Dr. Prinz, that if in discussing the paper I have made any criticism, it is because I received the note from the President instructing me to start something. I am ready to take my medicine now, later.

(To be continued.)

Words

Words are tricky things. Three or four words, arranged in one or another way, may precipitate a war, a divorce scandal, or a riot at a christening. You must watch words closely when you put them into advertising or correspondence. You must consider their effect on the other fellow. There was a street faker once, back in our home town, who was selling cough medicine. And he said, in one part of his discourse, that "thousands of persons would rise and acclaim the merits of Doperine if they were alive to tell the tale today."—*John Nicholas Beffel.*

MAINTAINING THE EFFICIENCY OF ELECTRO-DENTAL APPARATUS*

BY RAYMOND L. GIRARDOT, D.D.S., DETROIT MICH.

THE VARIED USES OF ELECTRICITY in dentistry have grown so rapidly in the past ten years, and its application so commonplace, that we seldom stop to contemplate what a crippled condition we would find ourselves in, should we be suddenly deprived of its use.

A consideration of "the Why and How" of some of our very wonderful apparatus might be conducive to awakening, amongst us, a greater sense of appreciation of it, and stimulating us to bestow a larger amount of well deserved care on our expensive and delicate machinery. With this end in view, let us first consider the dental engine, the most used, and probably the most abused, piece of our equipment.

THE DENTAL ENGINE

In no branch of art or trades, can we find an electric motor so compact, powerful, flexible, and smooth running, as that furnished by our manufacturers. It may run weeks without oil, with a dirty, roughened commutator, a burned out winding, and still spin merrily on. But to maintain the efficiency it once possessed, and which we should obtain, these things must be cared for and observed as they come about. We should not wait until a breakdown necessitates our attention to these details.

The outer cover is easily removed, exposing the commutator with its brushes. It will be found blackened, and if long neglected, with a heavy carbonized surface, and possibly the copper bars pitted and scratched. The current leaks around this deposit and the oil working up will eventually cause the soldered armature wires to become loosened. This cuts down the power and speed of the motor and causes the brushes to spark, often giving a characteristic odor.

The oil and carbon should be washed off with a small cloth moistened with chloroform. (Gasolene if used may become ignited.) Hold the cloth on the commutator with some pressure, and start the motor. Standing on a wooden floor or insulated carpet, you need fear no shock. The commutator may now be polished with a fine sandpaper disc held around the finger, while the motor is running. Do not use anything except very fine sandpaper, as it would ruin the motor. Moisten a cloth with a trace of oil, and apply this to the polished surface to slightly lubricate it.

If the wire gauze brushes are partially worn, leaving a few wires trailing behind on the commutator, remove the brushes and file the ends square. Always scrape off the carbon, and procure new brushes if they be badly worn.

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*Read before the First District Dental Society of Michigan, 1914.

The question of proper oil is very important. Each manufacturer markets an oil, suitable only for the bearings on his motor. For example: The space between the shaft and bearing in one make is 1 and ½/10000 of an inch. If the oil used were a trifle too heavy, it would not run through and lubricate; or if it were a little too thin, it would feed too rapidly and leak upon the commutator. As the bearing clearance is different with each manufacturer, each one supplies an oil suitable only for his own motor. I do not believe our manufacturers are trying to go into the oil business, but that they sincerely have the efficiency of their motors, and our interest, at heart. So by all means use the proper oil, and enough of it.

The groove in the pulley wheel on the end of the motor shaft is made to properly grip a certain size belt. When not worn out of size, it will pull over a belt hanging slack, without slipping. Hence the desirability of replacing the pulley wheel, when slightly worn, and using the belt made by the manufacturer of that pulley. Steel belts have been placed on the market, but they will absolutely ruin a pulley inside of a few weeks.

The top of the foot controller should be removed every six months, the contact plates cleaned, and the little cup-shaped holes in them filled with vaseline.

Sometimes the controller will slip when moving the foot lever, as if the spring were too stiff. In this event, the serrations of the rubber mat, on the bottom of the controller, will be found worn smooth. A new mat can be procured, and easily glued on. After many years of service, a wire in the controller cable will break, causing the motor to stop altogether, or run and stop and run again.

The cable can be very easily replaced. The wire tips are all numbered to correspond with the numbered terminals at each end. More difficulty may be experienced with the engine cable, as it is not so easy to pull it through the engine yoke, but anyone can replace it if he tries.

We now come to the point of finding out why the engine will not run. I say *engine* here, but the same rule holds true with any of our electrical equipment. We often unjustly condemn the manufacturer when we, ourselves, are negligent. We often allow a piece of apparatus to lie idle, to our great annoyance, waiting for somebody else to fix, when a little intelligent investigation on our own part could easily remedy the trouble.

Remember this rule: "*Read directions.*" The bitterest complaint that every manufacturer makes is that we do not read the directions received with the equipment, and keep them for future reference. I am advised that from two to three hundred thousand dollars are spent by dentists every year in repairs and adjustments, the greater percentage of which could be saved by simply "Carefully reading directions."

The next step, which is none the less important, is to first localize the trouble. Begin at the source of your current supply, and work down to the device itself. Find the trouble by eliminating the most probable causes:

First—Is the main source of current supply cut off? Turn on the electric lights and see.

Second—Is the current being supplied to your switchboard? See if the other apparatus will work that is supplied by the switchboard.

Third—Does the switchboard supply current to that particular terminal attached to the troubled apparatus? Exchange the terminal plugs with that of a piece of apparatus that does work. Maybe the switchboard fuse is blown out.

Fourth—Does the terminal of the wire in the instrument itself supply current?

A test lamp, or contact with the fingers, must now be used. The trouble will generally be found by this time, and in the case of the engine, an examination of the cummutator, foot controller, and cable, reveals no loose or broken wires, the trouble is of such a nature that it cannot be easily remedied.

LABORATORY LATHE

Referring to the laboratory lathe, the commutator must be cared for the same as that of the dental engine. The matter of lubrication with a certain brand of oil is not so important. In the oil cups will be found a piece of yarn which should reach through the spring to the wick. If this yarn is spoiled it must be replaced with a new piece.

ELECTRIC FURNACE

The most usual trouble with an electric furnace is the burning out of the muffle. After making sure that current is being supplied to the muffle, and that it is burned out, proceed to remove it by taking out the screws on the back of the furnace. Furnaces are shipped constantly from foreign lands to the manufacturer at a cost of from eight to ten dollars, simply to replace a muffle. The dentist could order the muffle by mail, and replace it himself in ten minutes, were he interested enough to find out why his apparatus does not work, and how to remedy the difficulty.

These burned-out muffles can often be repaired by exposing the platinum wires, and testing out each turn. When the broken winding is discovered, a piece of platinum wire can be easily bridged across the break, and the furnace is new again.

HOT AIR SYRINGE

With the hot air syringe, the contact button may become burned and blackened, and not permit the current to pass. This should be smoothed and brightened up. The muffle may have worked loose, or a fine wire disconnected. By simply taking the syringe apart, it may be tightened and any trouble remedied.

AIR COMPRESSOR

The most common cause of trouble with an air compressor is a dirty valve. The motor works, and the pump works, but no air is produced. The valve may be easily removed and cleaned in a few minutes. In spite of this fact, these bulky machines are shipped a great distance to have this simple operation performed. This, of course, is a great source of expense and annoyance to the dentist; but he was not sufficiently interested to learn how the machine worked.

AUTOMATIC SWITCH

Sometimes a little dirt will accumulate in the automatic switch and prevent a contact. The motor then will not run, but the reason can be determined by tracing out the trouble.

MOUTH-LAMP

The electric mouth-lamp may work intermittently, or not at all, simply because the bulb is not screwed up tightly.

It would be tedious to take up all of our apparatus, but what applies to one applies to them all.

I might here mention our dependence on local electricians to remedy our troubles. These men are accustomed to an entirely different class of work, and our instruments are just as unfamiliar to them as they may be to us. They experiment with them, run up a large bill, and often do more damage than good.

Remedy the trouble yourself, it is time well spent. If you do spoil something, the knowledge gained in the spoiling is worth the cost of the whole machine.

In closing, let me plead with you to practice prophylaxis on your electro-dental equipment.

Study it—Understand it—Care for it. In doing so you will develop a more friendly and appreciative feeling, and thus obtain a hundred per cent. more efficiency than as if you regarded it as a mere mechanical thing, producing a certain result.

As the great Goethe said, "What we do not understand we do not possess." So if we would possess those qualities of efficiency to which we are justly entitled, let us understand the workings of the apparatus which produce these qualities.

Where coöperation exists, harmony abounds. Where harmony abounds, efficiency is sure to be.

MAKING CONTRACTS*

BY T. W. MCFADDEN, D.D.S., WILKINSBURG, PA.

DENTAL SERVICES, like other things, are not usually sold for what they are worth, but for what they will bring. The supply of dentists and the demand for dental services are the things that naturally regulate the possible prices of dental services.

If we want higher fees, we must either decrease the proportion of dentists, or increase the demand for dental services: else form a trust or a professional union. But all this will do no good unless we ask higher fees. The things that tend to raise the price of dental services are: Education as to the value of dental organs, appreciation of good dental service, elimination of fear of the dental chair, and good salesmanship. The things that tend to lower the price of dental services are: Lack of knowledge of the value of dental organs, lack of appreciation of good dental service, the dread of the dentist's chair, and poor salesmanship.

Since the dentist draws his own plans and specifications, makes his bid, and does his work according to his own idea, it would seem to me that the salesman is the contractor, and that the contractor occupies a very important place in the practice of dentistry.

People, nowadays, want to know what they are going to get for their money, and I think they have a right to know. Of course, it is not possible to draw plans and specifications with the same exactness as a mechanical engineer or an architect, but it is possible to lay out your work in such a way that the patients will have a very intelligent idea of what they may expect for their money. It would not matter how honest a contractor may be, you would not have him build you a house without giving you a price before he started. And if you did, you would always have a doubt in your mind that he might have cheated you.

So it is with our patients. If we do the work before giving them a price, they are generally surprised when you render the bill, even if it is half what it should be. If there is going to be a surprise, it had better come first.

If you have made a contract, your patient knows what to expect, and you have a right to be surprised if he is not ready to fulfill his contract. If he cannot fulfill his contract, it is up to him to make an explanation instead of you—as you generally do when your bill is more than your patient expects and he has not money enough to pay.

I am firmly convinced that our losses from bad accounts will be reduced ninety per cent. if we always make a contract before starting. Our loss will not only be less, but we can get more for our services and our patients will be better pleased. You may lose some patients that you otherwise would have gotten, and again, you will not get some that otherwise would have gotten you. It is not enough to give patients what they ask for. It is the contractor's place to show the patient what he should have, and show it to him in such a way that he will want what he should have.

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*One of a symposium of papers on the Business Side of Dentistry read before the Lake Erie Dental Society, 1914.

If you see a brother practitioner who is getting good fees and is busy, you can make up your mind that he is either a good contractor, or a good dentist, and likely both. He is either educating the people as to the value of good teeth and giving them good dental service, or his brother dentist is educating them and he is convincing them that he can give them good service, and is delivering the goods. The man who creates the demand for good dental service is not always the man who gets the large fees. The man who takes no interest in educational work is often the one who benefits most by it. He is turning all his attention to making the contracts and rendering the services, while the educator fellow is creating the desire and getting all the knocks. The contractor cannot get good fees until the desire is created for good dental services.

The patient will not pay five dollars to have a tooth filled if he thinks the tooth is worth only fifty cents. So it is well for the contractor to be an educator, both for his own gain and for the benefit of his patient. Anything that tends to place a higher value on dental organs benefits both the patient and the dentist.

If you see a brother practitioner who is busy and getting poor fees, you can make up your mind that he is a poor contractor and likely a poor dentist. If he is working overtime and does not know enough to raise his fees, he is very likely going to slight his work in order to increase his income. This means a loss to both his patient and himself, and an injustice to his fellow practitioner.

If he is working overtime forty-five minutes each day, he should raise his fees at least 10 per cent. If he is working ninety minutes, he should raise his fees twenty per cent. The men who are doing themselves, their fellow practitioners, and their patients an injustice, are the men who are so busy that they have to work overtime. If these men will adopt the contracting system and sell their services for what they will bring, they will not have to work overtime, and their fellow practitioners can work full time and the people will get better dental services.

It is these overtime men who hinder the young man from getting a practice. They wear themselves out, slip into slipshod methods, and die about the time they find where they made their mistake—like the Dutchman breaking the team of oxen.

So, what the dentist needs most is to know how to build a practice by selling services. In order to build a practice by selling services, you must sell not only at a profit to yourself, but at a profit to the other fellow. The sale should be made so both the purchaser and the salesman will feel satisfied, and so each will have confidence in the other, and will feel that they have been well paid for the service rendered or the money expended.

There are persons practicing dentistry who have the ability to render satisfactory service, but who do not know how to sell this service. And there are persons practicing dentistry who know how to sell, but who do not render satisfactory service. Neither of these persons is building a practice by selling services, because they are not selling at a profit to both buyer and seller.

Again: There are persons practicing dentistry who have the ability to serve and who know how to sell their services. These are the persons who are building a practice by selling services. They know how to get the patient's confidence and can render satisfactory service. If you are a professional man and can render good service, it is of no profit to you unless you know how to sell it, and you cannot build a practice unless you sell it at a profit that will be satisfactory to both yourself and your patient.

You must sell your services at enough of a profit so you will not have to work overtime or slight the work in order to make the amount of money you think your service is worth. In order to sell anything, you must first have a mental picture of the thing you are trying to sell and of the value of the same. Then, if you can convey this picture to the mind of your patient, and create the desire for what you have pictured, you will likely make the sale, providing the patient is in a position to act, and you are salesman enough to bring about the action.

How am I to arrive at a proper valuation of my services?

Commercially, your services are worth what they will sell for, the same as any other article of monetary value.

If you can sell your services for ten dollars an hour and keep busy, your services are worth ten dollars an hour. If you cannot keep busy selling your services at ten dollars an hour, you are either trying to sell your services for more than they are worth, or else you are lacking in ability as a salesman, or you are not rendering satisfactory service.

No man practicing dentistry has any right to loaf when humanity is suffering for the lack of his service, any more than the man in the lifeboat has a right to sit idle when there are persons perishing in sight. So, I think we should sell our services for all we can get for them and keep busy. We owe something to humanity and that *something* is "our services." We owe *something* to ourselves and our families, and that something is "the best we can give them."

We owe *something* to our fellow practitioners, and that something is "the chance to do the thing we cannot do, and do ourselves and our patients justice." Our service is of value just in proportion as we are able, in a given time, to render an operation that will give the maximum amount of service, comfort and satisfaction.

The best proof I know of that we are selling and rendering service that gives comfort and satisfaction and secures the confidence of our patients, is, "Are we busy?" If we are not busy, there must be something wrong. If we have more than we can do, and keep up to the maximum in quality of service, we are not charging enough.

Every hour we work overtime, every operation we perform that is not up to the maximum in quality of service, every sale we make that is not for all it will bring, is doing ourselves, our patient, or our fellow-practitioner an injustice. Every hour we work overtime is injuring our health, every operation we perform that is not up to the maximum in quality of service is injuring our patient's health, and taking his good money for service that is not the best we could give.

Every dollar we undercharge is taking that dollar from our fellow practitioner and preventing us from providing for those dependent upon us as well as we otherwise could, and preventing us from giving to charitable institutions to relieve the suffering that we are not able to relieve in person.

Few people ever paid too high a price for good dental service. The higher price you get, the more stimulus you should have to render good service, and the more the patient will appreciate your services. The man who does himself, the profession, and humanity the most harm is the man who works overtime, charges inadequate fees, slips into slipshod methods and dies without having well served his patient, his family, or his profession.

Our service is of value just in proportion to the amount of supervision we need, whether we get it or not. In other words, the fewer mistakes we make, the more valuable our services. An assistant is of no value to me if I have to stand by his side all the time and supervise his work. I might as well do it myself, and if I do it myself, it is of value to my patient just in proportion as I am able, in a given time, to perform an operation that will render the maximum amount of service, comfort and satisfaction.

So, *efficiency* is the word.

If we expect to build a practice by selling services at a profit, we must become efficient, i. e., we must get more results for less energy and less outlay. That is efficiency.

If there is a higher percentage of results, it is efficiency. If not, not. In order to become efficient, we must have *enthusiasm;* we must have enough of *well directed energy* to keep up the momentum, enough of *system* to make the machinery run smooth, enough of *salesmanship* to put it over, and enough of *ability* to deliver the goods.

Efficiency means to keep no one about your office who does not have the ability in his special line, and who does not have the energy to keep going; to have your work systematized so everyone about the office will be doing some useful and profitable kind of work, so the persons whose time is most valuable will be relieved of little annoyances; so you will not have to transfer records and check up transactions; so it will not take six office girls to watch one and you to watch the bunch. Avoid complications. Time is money, and time and service are the only things the dentist has to sell. So, the man who can sell it at the largest profit is the man who understands the meaning of the words efficiency and salesmanship.

We used to think energy was the main thing in a successful practice. Now we know differently. Some people seem to think the more people they see, the more profit and the larger practice. They run two or three chairs, turn out two a minute, work early and late, but, when their trial balance is taken, about the only thing they have left is a wrecked nervous system, and the only thing their patients have is a lot of "that will do" sort of dentistry. This sort of men usually have no profit and their patients have no confidence in them and are not satisfied.

The main thing is not energy, but how to avoid the waste of energy. Not how to speed, but how to not speed and get the work done: that is efficiency. Efficiency means to devise and put into practice better rules and methods in handling your practice, thereby securing better results. Making every effort and every minute count: that is efficiency.

Business men know what efficiency means and the sooner the dental profession absorbs some of the ideas of the business man, the better it will be for both the profession and humanity. The business man knows that after he has his plant equipped and everything working to the highest point of efficiency, that he will not be able to sell his goods, it matters not what their merit, without salesmen and advertising. This is equally as true in dentistry as in business. We must have salesmen and advertising if we ever hope to be of any service to the great mass of humanity. It is estimated today that only eight and one-half per cent. of the people in this country have any dental service rendered except a tooth extracted when it aches. And this eight and one-half per cent. are not having one-fourth of the kind of dental service they need to protect them from the ravage of disease caused by neglected mouths and poor dentistry.

If this is true, why is it we are not having more young men entering the practice of dentistry? When you look at statistics and find that a great majority of the profession are not making as much money as train porters and street car conductors, it is easily understood.

But, why is it that the dentist is so poorly paid? Is it because there is not enough of money to pay for dental services? I think not. There is plenty of money to pay five times the amount, if we could convince the people of the relation good teeth bear to good health. And there is plenty of money to pay for ten times the amount of dental service if we could render this service without pain. So, education and the removal of pain, together with salesmanship, are the phases of dentistry that need boosting.

The dental profession is in about the same position as the manufacturer who does not advertise or employ salesmen, but depends on the merit of his goods to draw the public to a secluded room in an office building where you can get the article you need if you insist on having it, and can get the order taker to get a move on and serve you.

An educational campaign, backed by the profession, is of as much importance to the dentist as advertising is to the manufacturer, and it takes equally as good salesmanship to sell dental service as it does to sell any article of merit manufactured.

The public does not understand the important relation that good teeth and clean mouths bear to health. They cannot see the hopelessness of the efforts of the dental profession to meet the needs of the people. They do not understand what mouth hygiene means to the coming generations and how the loss of a tooth or an unsanitary mouth will affect the health. These are things that the dentist should preach, both as a body and individually. There are things that will benefit both humanity and the dental profession. It is impossible to benefit the profession by creating a demand for dental service, without benefitting humanity. We have goods to sell that have merit and that will sustain confidence and give satisfaction. So, why not boost? Why not get a good fee? There is plenty of money in the country.

There is more money spent for chewing gum each year than for dental service. More spent for jewelry, candy, ostrich feathers and nickelodeans, so, why say there is no money? What we want is the desire, and the money will be forthcoming. Money is nothing, desire is everything. The public does not care how much or how little they pay you. If they want a thing, the price does not cut much figure. So, what we want is desire for good dental service.

The most important barrier in the way of desire is the horror of the dental chair. Remove this, and desire will develop into resolve, and resolve into action, and your sale is made. Analgesia steps in here and eliminates a great part of the horror. Analgesia, I consider the greatest blessing to humanity in modern times and the greatest boon to the dentist. Every dentist should practice analgesia, should study salesmanship, and do all he can to educate the laity. Without education, salesmanship, and analgesia, dentistry will be of little practical value to either the dentist or humanity.

With the present pro rata of dentists, the task of taking care of the mouths of the people is hopeless, and to increase the pro rata of dentists, it is necessary that the young men get a mental picture of green pastures ahead, and so long as the old men in our profession keep their fees low, there will be little inducement for the young man to study dentistry. Young men are not going to enlist until they are convinced that they can do something for themselves. The young man is not thinking much about the good he can do humanity. This comes later. The young man knows from statistics that the life of the dentist is ten to fifteen years shorter than the life of the average man, and that a very small percentage of the profession are a financial success. So, if we want to enlist more recruits, it is necessary for us to become salesmen and make the outlook more inviting.

There is only one remedy that I can see, and that is, to teach the people the relation teeth bear to health, to remove the horror of the dental chair by relieving pain, and last but not least, to sell services at a profit to both the dentist and the patient. The first two are important, but are of no practical value without the last. A man can serve only a certain number and serve them well, so we must make some inducement to enlist more men if we ever hope to serve the people. The contractor or salesman is as essential to the success of the dental profession as the contractor and salesman is to any business enterprise.

So, let us have more education, better service, better salesmen and less pain, more sanitary mouths and better health.

BOOKKEEPING

Timekeeping is the most important requisite of any business. The only thing a dentist has to sell is his time, so he should keep an accurate record of the time spent on each and every operation, besides recording all conditions, treatments, restorations and operations.

Simplicity and accuracy are very essential in dental bookkeeping. The recording of conditions, treatments, operations and restorations necessarily requires a different form from the usual business.

I am displaying here my third attempt to make a chart or form suitable for keeping dental records and accounts. This chart gives me a complete picture of the mouth at the time of examination and as the work progresses. You do not have to rely upon your memory for anything and do not have to compare different sheets or turn from one side of the sheet to the other. Everything is before you on one side of the sheet.

You have the condition of the mouth, of deciduous and permanent teeth as revealed by examination, the condition as revealed by operation, the outline of the work needed, and record of work already in the mouth. You have the name and address, residence and business 'phone and age of patient, the patient's physician, the patient's reference and the person responsible for the payment of account, sheet number and reference to sheet number.

You have the estimated charge, cost of material used, time consumed, charge, credit, and balance.

You have the date of examination, date of operation, date of statement or letter, date of receipt, and whether payment was made by cash or check, and check number.

You can compare at any time, and at a glance can tell how much time you have spent on any operation or all operations, the cost of material for one operation or all operations, and can see in a minute what your time is netting you per minute. When you can put your finger on the operations that are consuming more time than you are getting paid for, if you are wise, you will raise your fee.

Accurate, simple, systematic keeping of records, to my mind, is very essential. It is very easy to find what your time is costing you per minute, and to estimate the cost of materials used in each operation. When this is done, you can tell at a glance approximately your net profit per minute on one or all operations.

When we can turn to our records and show our patients a full and complete record of each and every operation, it gives them more confidence in us. If they say you agreed to do so and so, for so much, or you filled this tooth and the filling came out, if they are mistaken, you can convince them much better from your records than you could by taking an affidavit to it. To say the least, your records, if accurately kept, will have a good impression on your patient. When you can turn back to work done years before and show the patient that you have a complete record of condition, estimate, time, charge, etc., it goes a long way with the patient, and is of great value and a source of satisfaction to you.

The keeping of accurate records of each operation or contract, I consider the most essential part of dental bookkeeping. If we take care of each operation and each account and can tell what our net profit is on each operation or contract, if we do not take a trial balance at the close of the year, our bank account will tell the story. It is a simple matter to keep an accurate record of all receipts and expenditures so we can tell what our net profit is for each month or year.

Dentists are usually poor bookkeepers, and to get the dentist to keep accurate records, you must show him a method that will not require any special effort and is mistake-proof. Aside from my record charts, practically all my bookkeeping is done in my check book and appointment book.

I keep a record of all cash received on my appointment book, and all expenses on my check book. I never pay any bill except by check. I write a check for incidental office expenses and this money is put in the cash drawer, and incidental expenses paid out of this cash until it is used up. Then I write another check. A slip is kept in the cash drawer to keep tab on these incidentals.

At the end of the month, I simply add up the cash receipts for each day and the amounts of the checks I have paid out and place these amounts opposite each other on a sheet where I keep the gross receipts and expenditures for each month in the year. When my year is closed, I foot up these amounts for all the months and the difference is my net receipts for the year.

To find the amount of business done for the year, I add up all outstanding accounts to date and compare with the outstanding accounts of one year previous. This shows me how much more or less money I have on my books than I had a year previous. Add or subtract this amount from the cash receipts and you have the gross business for the year.

I use a large check book and paste every check in place when it is returned and make any note I wish on the check stub. The check acts as a receipt and the check stub tells me what the check was for. This is simple and accurate—saves time, and time is money.

COLLECTION OF DEBTS

As I have stated, the making of the contract is the most important requisite in collecting. Next in importance is to have your statement on hand, or be on hand at the time agreed upon for payment. If you do not get the payment at the time promised, get another promise. And be on hand on time with a gentle reminder of the promise made.

When you cannot get a definite promise, or cannot see your patient, a system of letters, two or three weeks apart, will bring better results than statements or letters sent irregularly.

I believe most people can get better results with a number of stock letters than they can by letters dictated at the time. With your stock letter you save the time of dictating a special letter. You are generally not in the right frame of mind when the letter should be dictated, or else you do not have the time. So, you either say things you wish you had not said, or you neglect writing when it should receive attention.

If you have a number of stock letters, you can say to your assistant, send letter number one and follow up with two, three, four, five, and six, two weeks apart. The number of letter is recorded and your patient has no way of knowing whether you were in a good humor or not.

With this system you need pay very little attention to collections. Your assistant can attend to that and you can keep in a good humor and turn your attention to making contracts and rendering professional services.

Occasionally there will be something come up that needs your personal supervision. From your records you can tell the number of statements and letters and what was in those letters without referring to them or taxing your memory. You also have the substance of the reply to letters recorded under remarks.

So, system in collecting will not only collect your accounts, but will save you time and worry. Everybody should get a bill when work is completed and a statement the first of the month, and if the bill is not paid according to agreement, you should let them think you have not forgotten the agreement. It is well to have them think that the service you rendered them is of as much value as the groceries and dry goods, and that you need your money equally as much as the grocer and dry goods merchant.

I think everyone should frame his own system of letters. The letter that someone else has written does not sound like you and your patient thinks, ''Oh, he is just sending those letters out as a matter of form. He doesn't mean what he says." And when they come in, you verify what they think by putting it off on the office girl. To collect accounts you must be firm. Say the thing you mean and stick to it.

I have not much use for collecting agencies, and I do not believe much in going to law. Better compromise if your patient is not able to pay the bill or thinks you have overcharged him, and next time get the cash or make your contract before you do any work. Of course, there are exceptions to all rules, but this is what I believe will cover the great majority of cases.

PURCHASING SUPPLIES

Buy for cash and in quantities. A saving of from twenty-five to fifty per cent. can be realized by buying right.

This means two or four suits of clothes each year for the average dentist, or enough gasolene to drive a five-passenger car four to eight thousand miles, besides the convenience of having a stock of dental supplies always on hand to select from, and the saving of time in going to and from the dental depot or looking over goods of traveling salesmen.

The time saved by buying in quantities and always having a stock on hand means equally as much as the cash discounts. It pays. If you haven't the money, borrow it. It pays better to pay interest than to lose your discounts and the convenience of having a stock to select from.

In closing, let me repeat: The big word today in the business world is efficiency, and so the word that means most to the dentist and to humanity is efficiency. We should devise and put into practice better rules and methods of handling our practice, thereby securing better results. Make every effort and every minute count: that is efficiency. Business men know what efficiency means and the sooner the dental profession absorbs some of the ideas of the twentieth century business man, the better it will be for both the profession and humanity.

Time

Time, growing older, still his youth renews
  By pressing back the moments as they come.
Instant by instant tolls their loss or gain,
  And rolling up their totals, make the sum
Of human effort. No past can we retrieve,
  Though on the wreck of fortune may be built
Success. Enduring faith can still achieve
  Attainment out of loss — the loss a sacrifice
Made to Old Time, who brooding sits and sees
  How fools made hell of paradise.

APPEARANCE OF OFFICE—RECEPTION OF PATIENTS—EQUIPMENT*

BY J. D. WHITEMAN, D.D.S., MERCER, PA.

WITH THE MANY PHASES of the business side of dentistry which I am asked to introduce for your discussion, viz., appearance of office, reception of patients, equipment, and the financial side of the treatment of children's teeth, I find that I will be able to touch only the high spots and will have to leave their further development to you.

While the demand for dental service has been and is yet so great that the man who does thorough work has succeeded and even may yet succeed in keeping his time fully employed, entirely disregarding the appearance of his offices, his manner of receiving his patients, and care of equipment, all this argues nothing, for trivial as these things may seem, no one is so firmly established in his practice, or is so skillful or thorough in his work as to be able to disregard these really important phases of this subject, without seriously limiting his success, if not actually stultifying his professional standing. Yet we must confess that Paul's advice to his friend Timothy is the keynote to the successful practice of dentistry, as well as to that worthy disciple: "Study to show thyself approved, a workman that needeth not to be ashamed." The character of the service is the determining factor in successful dental practice. Dentistry offers a very poor field for four-flushing.

I believe the first thing to consider in the appearance of the office is cleanliness—it should be *strikingly* clean. If the office is on the second floor, particular attention should be paid to the stairway; dusty stairs and dingy hall-ways are not suggestive of pleasant thoughts to good housekeepers and may start other observations that might prove quite embarrassing were we aware of them.

The furnishings of the reception room need not be luxurious unless one has what might be called a high-class practice, but should be of good quality and modern and kept in good condition. One should look over his offices occasionally and try to imagine what his first impression would be were he a stranger entering them for the first time in the endeavor to size up the place, as he would a new competitor's, for instance. Acting on this suggestion myself, I have just found it advisable to make somewhat extensive changes in my own office.

Concerning the second division of the subject, the reception of patients, I shall have but little to say; manifestly a patient's visit to a dentist is for the purpose of receiving the benefit of his skillful services, conscientiously rendered, and is fully entitled to such assurance.

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*One of a symposium of papers on the Business Side of Dentistry read before the Lake Erie Dental Society, 1914.

Obviously, then, it behooves the dentist to approach a patient with only the kindliest feelings, with an intense honesty of purpose, and the desire to serve faithfully and conscientiously should pervade his whole being, when his manners may be largely trusted to take care of themselves.

Nothing will so cheapen a man as an affectation of dignity or any endeavor to act a part or any resort to subterfuge. If one were here today and away tomorrow, it might "go," but as the dentist is permanently located and comes in such close and frequent contact with his clientele his real self is sure to become known. A patient should always be extended a greeting sincerely cordial. You remember what Lincoln said about fooling people. True, one's receipts may be considerably increased for a short time by resetting plates that could be easily and satisfactorily repaired, by crowning teeth that could be better and more cheaply restored by a filling, by replacing posterior teeth with a string of facings and calling it a bridge, and by placing bridges where contraindicated, and by the general use of tanning or mummifying pastes instead of filling the canals. All these things are a betrayal of confidence and, if practiced, the indications will soon surely be clear and unmistakable that a change of location will be indispensable to continued prosperity. Dentistry can be most successfully practiced on the square.

That ours is a notably progressive profession is quite generally understood and appreciated by the public. Is there anything more natural, therefore, for a patient entering an office for the first time to look for evidence of progressiveness in the dentist, the office and its equipment? And incidentally, I want to say that the regular attendance at dental society is the very best possible evidence of progressiveness, and is always so recognized by the public. Obviously, then, progressiveness is one of the big cards for a would-be successful dentist to play.

With the latest and best appliances at hand, it is only a logical conclusion that the latest and best methods are employed, and while it is true these appliances sometimes seem to require an investment out of all proportion to their actual worth, and their purchase seems at the time but little short of extravagance, the fact is, curtailed equipment is itself the extravagance and one in which no dentist can afford to indulge; as some one has said, "It may take years to judge one's work, but the equipment may be judged at a glance," and a mere glance at the equipment generally creates the first impression, and may at once serve to establish or shatter confidence.

I cannot leave this subject of equipment without a word in regard to sterilization and sanitary equipment.

There is nothing more appreciated about the office, by the patient, than its sanitary equipment, unless it is its sanitary condition.

The feeble pretensions in this direction by many is little short of ridiculous. In the first place it should be borne in mind that sterilization demands consistency, and that what ordinarily passes as cleanliness may be far removed from sterilization or surgical cleanliness.

In the sale or introduction of the various sterilizers with which the market has been flooded during the last few years, great stress was laid, by the salesmen, on the mental effect produced by the word "sterilizer" conspicuously displayed across the front of the purposely elaborate apparatus that it may not fail to attract the attention of the patient. Now, this seems to be regarded by them as their strongest selling point, guaranteed to insure a most happy mental effect on the patient. It would seem, however, that to secure the value of this feature would require that the patient actually see every instrument or appliance used in his operation subjected to the influence of this sterilizing apparatus. And it should not be forgotten that this much-to-be-desired mental effect may suggest a train of thought and possibly a spirit of investigation by this same patient. What is the condition of that table top? Is it covered with a soiled napkin or paper, or strewn with old burs and broaches filled with debris? How about those burs that are taken from the bur rack to the hand piece and put back again—are they not taken from one mouth and put back there for use on the next patient? And is it not ludicrous to see a man make such a great show of sterilizing the mouth mirror and then remove a pulp with a broach that has already been in other infected root canals?

Now, gentlemen, this is not in denunciation of sterilizers, sterilization, or the education of the public in its necessity, as the public is learning it from other sources than from us. I merely wish to call attention to the fact that the public fully appreciates the necessity for surgical cleanliness, and that our offices and equipment are being subjected daily, and unconsciously to us, to increasingly critical inspection by our patients and that it is not only our duty but "good business" to be fully awake to this condition.

"As a chain is no stronger than its weakest link," so is it equally true that one's equipment is no nearer sterile than its most infected instrument. So I say, sterilize, but sterilize everything, and do it so thoroughly that the results will bear inspection, as the discovery of weak or broken "links" by the patient will result in negative advertising and even reflect on our intelligence.

The financial side of the care of children's teeth is indeed a difficult proposition.

A parent brings a nervous, frightened child to us, under five years of age, with its teeth neglected, under the impression that some simple remedy on cotton placed in the cavity is all that is required; that the teeth being only, as they say, "baby teeth," are of no particular account, and are accordingly indisposed to be put to much expense on their account.

Now, we have here an educational proposition of no mean proportion, to be sure, and a case that to do the child justice, requires skill, time, tact and patience to tax the most gifted, and any other specialist for treating a case requiring the same time, care and skill in their respective lines would require a fee far in excess of our fondest hopes.

Now, the question is: How shall we conduct this case in order to do the child justice and at the same time secure an equitable fee? It seems to me that the first thing to do after an examination of the case is to take a few minutes to state the amount and character of the work required and in enlightening the parent on the importance and value of the temporary teeth, that the loss of a single tooth means impaired nutrition at a time of life when the physical economy is least able to bear it; that the presence of each tooth for its allotted time is all-important in the development of the jaws and indispensable to the regularity of the permanent teeth and facial development, and not fail to deeply impress upon them the fact that the physical well-being of the child demands the restoration and preservation of these temporary teeth until time for nature to replace them.

It should be stated that the temporary teeth are worthy of and will require our very best efforts; but that the difficulties are many and will have to be shared by all concerned; that it is up to them to secure the child's promise to permit us to do the work—in other words, it must be expressly understood by the parent that we are ready to do the work, but they must provide the opportunity. And if the parents are assured that we only undertake such cases on a time basis, the child will not be permitted to waste our time as they usually do under other conditions.

The reason why parents are asking for palliative treatment only for their children's teeth is that we, their dentists, have failed to tell them anything else was required. But there is another side to this proposition. In case we are unable to sufficiently impress a parent with the importance of saving the child's teeth, of course there is no other way but to temporize, always endeavoring, however, to preserve the teeth as long as circumstances will permit. But the financial side of the treatment of deciduous teeth is not so much dependent on the compensation received for the service rendered as the opportunity to make friends with these children who are so soon to become our very desirable patients. We have here an opportunity to impress upon them the proper care and value of the teeth, the necessity for regular visits, and best of all, that to have teeth filled really doesn't hurt so very much after all—the financial aspect of which is too obvious to require pointing out.

The coming man is seldom noticed until he arrives.

REMUNERATION FOR SERVICES*

BY DR. H. C. STURDEVANT, LINESVILLE, PA.

WHEN DOCTOR SMOCK ASKED ME to write a short paper on how to get a proper remuneration for our services, I thought he was joking and I cannot figure out yet why he wanted to select so small a man from so small a town to handle such a large subject, but I will give you what I have learned from being twenty years in practice.

I have been attending society meetings for a good many years and have noticed that the presence of a few *big* men from a few big cities, with their methods of getting big money out of a rich clientele, was about all there was to the meetings, outside of the pleasure of meeting the boys, from year to year.

Of course, we all envy the big man his big place in the world and his big fees, but what we common fellows, who are located in the small cities and country towns, need most is to get right down to brass tacks and study actual conditions as they present themselves in our waiting rooms from day to day.

When I went to college, and I don't think it has changed much yet, we were taught how to make gold plates and continuous-gum plates, and a lot of stuff that the average dentist will never make in his life time, and we were always talked to as though, of course, we were all going to have an office on the avenue and have a rich class of people to work for, who didn't care what their bill was, instead of being told how to get a fair remuneration for good, honest work for common, ordinary people, which are the kind most of us have to handle.

Come with me for a few minutes and we will study human nature as it goes up and down the streets of every town and city in the land. People are all alike, with a few variations. Suppose we go out and bring in the first dozen, twenty-five or fifty people we see and stand them up in a row and analyze them one by one, and then take an average. What do we get? How large a percentage of those people will want the cheapest work they can get? How many will want good, practical work at a fair price, and how many will want the best thing they can get, regardless of price?

I believe that human nature is so nearly alike the world over, that if the dentist is a salesman and a good judge of people, in a large majority of cases he can talk his patients into buying a good article at a good price, and then it is up to him to make good by selling just what they buy.

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*One of a symposium of papers on the Business Side of Dentistry read before the Lake Erie Dental Society, 1914.

I consider that a dentist is wrong in the head who will talk a patient into good work and then put cheap material, or too little of it, into the case in order to make a big profit.

One dentist said to me: "What are you going to do when a patient comes in and says, 'How cheap can you make me a good plate?' And you say, 'Twelve, fifteen or twenty dollars,' as the case may be; and he says, 'Why, Doctor So-and-So offered to make me his best plate for six, seven or eight dollars, and guarantee it for twenty years—or perhaps forever.'' Ninety-five per cent. of those people, if handled properly, will pay for a good article, and they will always be boosters, because good work gives satisfaction, and that always pleases; while the fellow who puts in the cheap work is committing slow suicide, as the patient has forgotten that he bought shoddy work, and ought not to expect much result, and he yells and throws dirt when the work goes wrong.

I worked the other day for a man who works hard for his money, and he showed me two molar inlays that a dentist of Cleveland put in for him six years ago, and he said he thought when he paid his bill that he had been "stung," as the bill was $44.00. But he said they were giving splendid service and he guessed they were worth the money.

I have a friend who had a flashily dressed colored woman come into his office to find out how much he would charge her to make her a plate, and not caring to work for people of color, he thought he would make it easy for her by saying that $25.00 was the cheapest plate he made. The colored woman said: "That is just what I want. I knew this was the place to come. Why, you know that Doctor Jones offered to make me a plate for $8.00 and I wouldn't have no cheap trash like that, nohow. No, sir; here is $10.00 down and I will pay the rest when I get the plate." And my friend had to make her a plate.

How many men are there here today who would go into a shoe store or a tailor shop and think of buying the cheapest pair of shoes or suit of clothes they could get? I dare say, not one of you. And you are no different to a large majority of people who come daily into our waiting rooms. It is up to us, as dentists, to educate these people, that good dentistry is just like buying anything else. We never get more than we pay for, and as the work in people's mouths doesn't go out of style, like clothing, and it isn't a pleasure to have it done, *of course* they can see the advantage of buying a good article.

I have found that the easiest money I make is the few minutes it takes to explain the difference between cheap material and good material, and it surprises me nearly every day how easy it is.

I never have any set price, but always tell my people that the price is governed by the quality of the work and the amount of material used. A molar crown with a heavy cast top will sell for ten or twelve dollars as easily as a thin crown will for five or six dollars, and the patient who buys the good crown will send you his friends for years, while the fellow who made the thin crown will have to move.

SHOULD THE BUSINESS SIDE OF DENTISTRY BE TAUGHT IN DENTAL COLLEGES?*

BY H. E. FRIESELL, D.D.S., PITTSBURG, PA.

THE THEME GIVEN THE WRITER for his share of this symposium, in his mind admits of but one answer—"Yes." However, inasmuch as a paper limited to one word besides the title might not hold the interest of the audience very long, it is possibly well to elaborate somewhat.

Let us, like the proverbial Yankee, answer this question by asking two others:

First—Has dentistry any business side that it is necessary for a practitioner to know?

Second—If he isn't taught the salient points of the business side of dentistry in college, where is the young practitioner to learn them?

Having been graduated from college and licensed by the state board to enter upon practice, the young dentist is confronted by a series of problems. He must procure an outfit, supplies, furnishings, and a suitable location. All of these things are necessary before he can begin to make a living.

The beginner must have money, and he must exercise judgment in the expenditure of that money, in order that he may buy only the things that are really necessary at first and defer purchasing the least essential till last, and avoid buying the non-essentials at all. The selecting and furnishing of rooms in a suitable location requires foresight and experience, and as the young graduate rarely has any experience and probably limited foresight, intelligent assistance in these matters may be of very great importance.

The fact that many men begin practice with only vague ideas of the value of their services, or the cost to them of the rendering of such services, and the further fact that the young practitioner is seldom able to charge such a liberal fee as to make the cost of his services a matter of minor importance, are surely sufficient reasons for concluding that dentistry has a business side, and that unless the young man possesses either a congenital or an acquired amount of business acumen, his success or failure from the standpoint of an income will be largely a matter of chance.

The young practitioner is prone to figure that nearly every cent he receives as fee for an operation is clear profit. He reasons that the cost of the materials used, especially in an operative procedure, is only a few cents, and that therefore the balance is profit. He fails to place a real value on his time, and the time he consumes in the operation is the most costly thing he puts into it. A dentist has only a certain amount of time each month that he can devote to practice, and unless the fee secured pays a reasonable profit on the sale of this time, he is not making anything, and may possibly be losing money.

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*One of a symposium of papers on the Business Side of Dentistry read before the Lake Erie Dental Society, 1914.

Again, he fails to count against each operation the overhead expenses, such as interest on the money and the time he has invested in his education—which is his capital in business—and the money he has invested in his equipment, etc., with its steady depreciation.

An intelligent recognition of these facts, and the asking of a sufficient fee to pay not only the up-keep and interest on investment expenses, but to allow a sufficient amount in excess to constitute a suitable profit or income, is one important phase of the business side of dentistry. Many good dentists have failed through lack of business knowledge. Many inferior dentists have succeeded beyond their professional deserts as a result of their having sufficient business acumen to overcome much of their professional weakness.

In the early days of dentistry, when the beginner served an apprenticeship with a preceptor, for which he gave his services and from one hundred to one thousand dollars in money, the business side of conducting a practice was learned along with the acquisition of the technical education; but since changing conditions have eliminated the preceptor, the only chance the young dentist has to gain a knowledge of the business side of dentistry is during his college days. Inasmuch as college infirmaries are not conducted for profit, and there is little or no business relationship between the patient and the student, it is the essayist's belief that a distinct course in the business principles of dentistry should be included in the curriculum of every dental college.

Such a course, under the caption, "Dental Economics," has been taught for several years in the Dental School of the University of Pittsburg, and a very brief outline of the topics treated in the course may be of some interest:

I. Evolution of method of training students in how to conduct dental practice.
    a. Preceptorship.
    b. College, etc.
    c. New methods better than old, because:
        1. More systematic instruction.
        2. Greater information and broader education (business) because of many teachers instead of one.
    d. Curricula do not demand preliminary dental or business training, hence necessity of special training along lines of office practice.

II. Two aspects from which to consider conduct of practice, viz., professional and business.
  a. Professional.
    1. Implies service to fellow man.
    2. Duties and obligations to fellow practitioners and profession in general.
    3. Other ethical considerations.
    4. True guide is golden rule and individual conscience.
  b. Business.
    1. Remuneration to self.
    2. Square dealing, etc.

III. Methods by which student may acquire knowledge of business methods for conduct of practice.

IV. Mention of various topics relating to the conduct of a practice.
  a. Selection of a location.
    1. City or small town.
    2. Selection of office.
  b. Furnishing office and selection of outfit.
  c. Management of patients.
    1. General observations previous to seating in chair.
    2. Pleasing address.
    3. Personal appearance.
    4. Cleanliness.
    5. Tact, mental poise, square deal, kindly manner, suggestion, painless methods, etc.
    6. Preparation for examination.
    7. Preliminary arrangements as to fees, operations, etc.
    8. Appointments.
    9. Conduct at chair.
    10. Manner of handling patients to eliminate fear, to inspire confidence, and for general control of patients.
    11. Management of children.

V. Fees, based not only on cost of material but also on overhead charges, such as interest on investment in education, equipment, running expenses, value of time, etc.

VI. Records, bookkeeping and handling of accounts.

VII. Office assistant.

VIII. The purchase of supplies, general expenses, payment of accounts, investments.

IX. General Points.
  a. Competition on different plane than that of merchant or mechanic.
  b. Various attributes and virtues conducive to successful practice.
  c. Instruction as to rights, privileges, and responsibilities under law and ethics.

  - d. On attaining friends and acquaintances.
  - e. Companions, societies, and social and professional environment generally.
  - f. General considerations of means of practice building.
  - g. Raising of fees based on increased skill and knowledge of the operator, and greater demand on his time, and greater value of his services to patient.

X. Infirmary practice as guide to proper conduct of private practice.
  - a. Primary motive in school clinic to teach practice of principles and methods taught in lectures and demonstrations, while in private there is double motive of service to patient and income to practitioner.
  - b. Necessity of special instruction to students that they may not misapply in practice the principles and methods which are necessary in school clinics.

XI. Bearing of correct records on prosecution, blackmail, mistaken claims, etc.
  - a. Itemized accounts.
  - b. Original entry, etc.

To enhance the value of the course in dental economics and ethics, which should go hand in hand, the students in the University of Pittsburg are divided into groups, and a group is assigned to each dentist on the faculty. This teacher serves in the capacity of preceptor to the students in his group, and not only advises them regarding their college work and studies, but is prepared to supervise the same, and to discuss with them intimately the many phases of practice that cannot be taught to men in classes, but which are nevertheless important and for their proper elucidation require to be modified to suit the individual case.

Many of the ridiculous cases of competition among dentists, especially in the smaller towns, would not occur if the parties thereto realized the actual cost to themselves of the services they sell. The science of accounting has thus far failed to demonstrate how one can successfully injure a competitor by doing business at a personal loss to himself. A knowledge of dental economics should remedy this evil to a considerable extent.

Warning

A man representing himself as an agent for THE DENTAL SUMMARY has been operating in various parts of Ohio, securing subscriptions from dentists, collecting money—and vanishing. He last appeared at New Straitsville, where he appeared to be deaf and dumb.

No such person is authorized to represent this magazine in any capacity, and dentists are warned to look out for him.

It is always well to demand credentials from strangers before transacting business with them, especially such as requires the payment of money or the assumption of any obligation.

PAST AND PRESENT DENTAL ORGANIZATIONS IN OHIO, OTHER THAN THE COMPONENT SOCIETIES

BY EDWARD C. MILLS, COLUMBUS, OHIO.

THE "GET-TOGETHER" SPIRIT manifested itself early in the dental profession of Ohio, as the third society of record, the Mississippi Valley Association of Dental Surgeons, was organized at Cincinnati in 1844. That dentists have been favorable to associations is evidenced by the following list of societies. While many had an ephemeral existence and almost cease to be a memory, others have passed the half-century mark and will continue indefinitely their mission of benefit to the members and the public. Lukewarmness toward the organization of components in some sections was explained in the statement, "We had a society here once and it died out." Until we have made a study of the environment, the conditions found in the different sections, and the means of overcoming them, we cannot hope for the permanence of our component organization in its entirety. These societies, though fostered by the state society, are its bone and sinew, and a liberal policy should be followed in aiding in the programs and adding features to the meetings that will create interest and enthusiasm.

The compilation of the following list of societies is for the purpose of placing on record a page of authentic historical facts. Also when the data relative to the component societies on pages 579-84 of this volume are properly seasoned by time, the following material will offer statistical matter to compare the efficiency of the present to the former independent plan of organization. Diligent effort has been made to obtain a complete list of societies, and the writer desires information of any omissions; also of societies marked.*

Akron Dental Society. Organized Jan. 10, 1905; met monthly; discontinued previous to Nov. 5, 1909.

Allen County Dental Society. Organized Sept. 25, 1908; met monthly at Lima; reorganized Nov. 30, 1909, as the Northwestern Ohio.

Alumni Association of the Ohio College of Dental Surgery. Organized March 6, 1879, at Cincinnati; supposed to meet annually.

Central Ohio Dental Association. Organized Jan. 15, 1861, at Columbus; adjourned to meet at Newark, July 10-11, 1861. Next meeting postponed until call of president; no further meeting.

Central Ohio Dental Association. Preliminary meeting at White Sulphur Springs, Aug. 2, 1865, during meeting National Dental Association; organized at Mansfield, Sept. 5, 1865; last meeting at Newark, May 12, 1868. Met 2d Tuesday in May and November.

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*The invaluable assistance and research made by the many dentists throughout the state is hereby acknowledged.

Cincinnati Academy of Dentistry. Organized about 1896; discontinued about 1904; met monthly.

*Cincinnati Association of Dental Surgeons. Adopted constitution Jan. 6, 1844, and had regular meetings for one year; another was adopted in 1848, and meetings held several years.

Cincinnati Dental Association. Organized Sept. 8, 1858; reorganized March 24, 1873. Both met monthly.

Cincinnati Dental Society. Organized Nov. 30, 1880; met monthly, and discontinued about 1884.

Cincinnati Odontological Society. Organized March, 1886; met monthly. Changed name to the Cincinnati Dental Society and reorganized as a component; charter dated Sept. 17, 1909.

Cleveland Dental Society. Organized Nov. 6, 1886; met monthly; adopted constitution May 3, 1909, making it a component.

Columbus Dental Society. Organized April 24, 1896; met monthly. Reorganized as a component June 29, 1909; charter dated Sept. 17, '09.

Darke-Randolph Counties Society. Organized at Greenville, O., January 15, 1911; meets 2d Wednesday in Jan., March, July and Sept.

Dayton Dental Society. Was never duly organized. Attempts at the office of J. L. Zell in Dec., 1900, and Feb., 1903, resulted in a society name but no organization.

*Dental College Society of Cincinnati. Organized June, 1865.

East Liverpool-Wellsville Society. Organized April 1, 1913; meets second Tuesday each month.

Eastern Ohio Dental Association. Organized at Canton Aug. 29, 1871; met semiannually in February and August. Announced dissolved at the December, 1875, meeting of the Ohio State Dental Society by Dr. J. W. Lyder, chairman of the executive committee.

Forest City Society of Dental Surgeons. Organized at Cleveland Sept. 12, 1868; met annually in June. Adjourned *sine die* June 3, 1873.

Hamilton Academy of Dental Surgery. Organized Dec. 14, 1905; met monthly; last meeting Sept. 25, 1909. Reorganized as Butler County Society Oct. 22, 1909; charter dated Nov. 20, 1909.

Hancock County Dental Society. Organized at Findlay Sept. 17, 1909; met monthly. Voted Jan. 9, 1914, to combine with Seneca into a component; effected April 23, 1914, at Fostoria.

Knox County Dental Society. Organized about 1900 at Mt. Vernon: supposed to meet monthly, but always left to discretion of the president; adjourned in 1911 to meet at call of the president.

Licking County Dental Society. Organized at Newark in 1893; held about four monthly meetings and lay dormant until reorganized in 1898; met monthly. Suspended meetings after two years.

Lima (City) Dental Society. Organized at Lima in 1886, and discontinued in 1892; another by same name was organized in 1897, continued until 1899; was reorganized in Spring of 1901, and ceased in 1903. Each of these societies met monthly.

Logan County Dental Society. Organized at Bellefontaine Dec. 11, 1907; met monthly. Continued until Jan. 23, 1909.

*Lorain County Dental Society. Organized Jan. 20, 1898; met four times a year. Discontinued after 1909.

Mad River Valley Dental Association. Organized at Springfield, Ohio, Oct. 25, 1859; reorganized same city April 27, 1865, and suspended meetings about 1876; reorganized at Dayton, Oct. 24, 1882; met at first quarterly, semiannually, and later annually. Last (?) meeting of the society held at Dayton May 18, 1886.

Mahoning Valley Dental Association. Organized at Youngstown Nov. 4, 1867; adjourned to meet there first Tuesday in Jan., 1868. No record of this or subsequent meetings.

*Mahoning Valley Dental Society. Organized about 1883; discontinued shortly.

*Mahoning Valley Dental Society. Organized about 1896-98; discontinued shortly.

Mississippi Valley Association of Dental Surgeons. Organized Aug. 13-14, 1844, at Cincinnati, in the lecture room of the Medical College of Ohio. Last meeting April 15-16, 1896, Ohio Dental College building, Cincinnati, O. Met annually in February and later in March.

Miami Valley Dental Society. Preliminary meeting March 12, 1906; organized April 2, 1906, at Dayton; met monthly. Reorganized as a component Nov. 10, 1909.

Muskingum County Society. Organized at Zanesville Sept. 23, 1911; met monthly. Merged into the Muskingum-Coshocton-Guernsey Society, June 26, 1913.

*Muskingum Valley Dental Association. Met monthly at Zanesville, Wm. Herriot, president; W. W. Chapelear, secretary; notices of meetings appeared in *Dental Register*, 1870.

Northern Ohio Dental Association. Organized at Cleveland Nov. 3, 1857; meets annually.

Northwestern Ohio. (See Second District.)

Ohio Dental Library Association. Organized at Columbus Jan. 26, 1905; meets at call of president.

Ohio State Dental Society. Organized at Columbus June 26, 1866; reorganized Dec., 1884; reorganized Dec., 1907. Affiliated as a component of the National, Dec., 1912; meets annually first Tuesday in December.

Ohio Valley Dental Society. Organized at Steubenville Dec. 12, 1887; met quarterly. Discontinued Nov. 2, 1892; reorganized at Wheeling, W. Va., Jan. 23, 1902, met semiannually, and ceased May 4, 1908.

Sandusky (City) Dental Society. Organized March 28, 1900, and Sept. 1st of the same year reorganized as the Sandusky and Norwalk Dental Society; met annually. Was merged into the North Central Ohio as a component at Cedar Point June 23, 1913.

Sandusky County Dental Society. Organized at Fremont April 5, 1904; held meetings continuously 2d Tuesday of each month until May, 1913, when it was merged into the North Central Ohio June 23, 1913.

Second District, or Northwestern Ohio Dental Society. Organized at Toledo Nov. 29, 1889; met annually 2d Tuesday in Sept. Changed name to the Toledo Dental Society Nov. 11, 1898; met monthly; was made a component Nov. 10, 1909.

*Seventh District, or Southwestern Dental Society. Organized at Dayton May 20, 1889; held four annual meetings, and discontinued 1892.

Southwestern Ohio. (See Seventh District.)

*Tuscarawas Valley Dental Association. Notice of this society's meetings appear in the society notices of the *Dental Register* from Nov., 1869, through 1870, calling notice of the annual meeting in Nov., 1870. President, John McKinley, Uhrichsville; secretary, L. E. Disney, Coshocton. No further information obtainable.

Tuscarawas Valley Dental Association. Organized at New Philadelphia May 10, 1892; met 2d Tuesday in January and June. Held its last meeting at Canton Nov. 31, 1900.

Wood County Dental Society. Organized at Bowling Green March 18, 1908; met monthly. Reorganized as a component Nov. 10, 1909.

Youngstown Dental Society; meets second Monday each month. Organized October, 1908.

Flowers

These flowers, stunted and denied,
I planned to flourish, glorified.
The air was cool, and Spring was new,
I planted them, and as they grew
I took of them no further care.
I planted them — and left them there.
Yet I believed, I know not why,
My flowers would grace and beautify
The garden spot I placed them in.
Yet now, distorted, dwarfed and pale,
Neglect declares its bitter tale,
And I convict me of my sin.
So human flowers, planted, fade,
That cherished might all time pervade
With blessings flowers yet to be:
And this reflection dwells with me.

EDITORIAL

Another University Dental College

For several years the president and trustees of the Ohio State University have been considering the inclusion of medical and dental departments in the university. Last winter the state legislature authorized the taking over of the Starling-Ohio medical and dental properties and the university trustees voted to accept the departments in the state university, the affiliation to take place at the beginning of the school year this fall. These schools are now integral departments of the Ohio State University. This new arrangement means much to both institutions and thousands of dollars have already been expended for additional equipment and increased facilities.

The Starling-Ohio Dental College has in the past been a worthy school and has given an excellent course of instruction, but its elevation to a department of a state institution will make its further advancement in every direction possible. Its standing is now on a par with the dental departments of the University of Pennsylvania, University of Michigan, and other state institutions.

The Ohio State University is becoming a great college. Its total enrollment this year will reach five thousand and the great state of Ohio will see that its needs are fully supplied. With such financial backing and under the able guidance of its worthy dean, Dr. H. M. Semans, the dental department will be second to none.

The college and the profession are to be congratulated and the future development of the dental department will be watched with pride by all.

The work that lives is constructive work. Who knows anything of the critics of the centuries past? They are forgotten. We remember Bruno, Copernicus, Harvey, Newton, Priestley and Darwin, and their names will be written on the eternal tablets of fame. Yet in their own days they were howled down by the mob and assailed by the "authorities." Can you recall today the names of those "authorities" even one of them?

OBITUARY

Resolution on the Death of Dr. G. E. Hunt

"*Whereas*, Almighty God in His infinite wisdom has seen fit to remove from the scene of his earthly labors, Dr. George Edwin Hunt, M.D., D.D.S., and

"*Whereas*, The Wisconsin State Dental Society desires to record its appreciation of him as a man and its sense of sorrow at his death; *Therefore, be it resolved,*

"That the Wisconsin State Dental Society extends to the family of the deceased its sincere sympathy in their bereavement, and that this resolution be spread upon the minutes and a copy be sent to the family and to professional journals for publication.

"W. F. Faust,
"Chas. L. Babcock,
"E. A. Geilfuss,
"Committee."

To Honor Memory of Dr. Hunt

The dental profession of Indiana will have a memorial service in honor of the memory of Doctor George Edwin Hunt, to be held in the auditorium of the Masonic Temple, North and Illinois Streets, Indianapolis, Ind., on the evening of November 21, 1914, at eight o'clock The principal address will be by Dr. John N. Hurty.

The friends of Doctor Hunt are cordially invited to attend this service.

Carl D. Lucas,
Chairman of Committee.

Resolution on the Death of Doctor Knapp

At the September meeting of the Lorain County Dental Association the following resolutions were adopted:

"*Whereas*, Under the dispensation of Providence, it has pleased Almighty God to take unto Himself the soul of Alfred Churchill Knapp, our friend and associate; *Therefore, be it resolved,*

"That we, the members of the Lorain County Dental Association, do hereby record our recognition and appreciation of his ability, sincerity and loyal devotion to the high ideals of Christian fellowship and service.

"In his profession he was conscientious and skillful: in his social life he was ever friendly and agreeable; in his home life he was kind.

thoughtful and considerate. Wherever and in whatever department of life he was known he will be greatly missed.

"*Be it further resolved,* That we extend to Mrs. Knapp our deepest sympathy, with the prayer that God may sustain and comfort her in this, the hour of sorrow and bereavement.

"*Further be it resolved,* That this resolution be spread upon the records of this association, that a copy be sent to Mrs. Knapp, and a copy to our dental magazines.

"J. Ed. Betteridge,
"B. E. Saunders,
"*Committee.*"

Obituary

Dr. Frank F. Hanske, who has been associated with Dr. S. M. Cummins, of Elkhart, Ind., for the past twenty-five years, died Oct. 6, 1914.

Doctor Hanske was in poor health and ended his own life in a moment of despondency. He was born in Belleview, Ia., Nov. 30, 1864. In his early manhood he spent two years as a clerk in Chicago. In 1886 he entered the office of Doctor Ray, of St. Joseph, Mich. In 1889 he became associated with Doctor Cummins, of Elkhart, Ind., who says, "He was a proficient, faithful and honest employe."

February 9, 1889, he married Miss Grace Guernsey, of St. Joseph, Mich.. Surviving Doctor Hanske are his wife, one son, Hiram G. Hanske, aged 23 years, and one daughter, Mary E. Hanske, aged 17 years.

Concentrate Your Energies

Concentrate.

With steadiness, courage, dare-determinedness — burn a hole into things. No matter what the thing at hand may be.

Concentrate.

The wheel of action and of business moves by steady turns around one central hub. In success, rim, spoke, hub hold tight together, and as though human, think, plan, move as one.

Concentrate.

Results come always to the persistent. Opportunity goes out of its way to get hold of the hand of the sticker. The eye of the boss is drawn irresistibly to the desk of the doer. Concentrate.

Concentrate.

Draw the details together. Formulate your day's plan. Strike a pace. Make every minute and every move count. Concentrate. And the finished job will be the day's goal—twenty-four hours of life well worth while.

Concentrate.

NEW PUBLICATIONS

All books reviewed in these pages may be obtained from the publishers of THE DENTAL SUMMARY at prices quoted.

A Manual of Dental Prosthetics. By George H. Wilson, D.D.S., formerly Professor and Demonstrator of Prosthetics and Metallurgy in the Dental Department of Western Reserve University, Cleveland, Ohio. Second edition enlarged and thoroughly revised. 12mo, 531 pages, with 386 illustrations. Cloth, $4.00, *net.* Lea & Febiger, Publishers, Philadelphia and New York, 1914.

This new edition of Wilson's Dental Prosthetics is a most thorough revision of a work which in its first edition won immediate recognition as the ultimate authority in its field. To those who have used the first edition, the new Wilson, embodying, as it does, the results and conclusions of additional research and study, will be most welcome. For the student it opens up the entire subject in one clear, concise and authoritative volume.

The author with discriminating judgment has closely confined the book to the consideration of the major subject. His studies in plaster of Paris have been carried to a point much in advance of that indicated in the first edition, and the principles underlying its use are most clearly stated. A valuable section is that devoted to vulcanite. The author's experiments have been fruitful of much new data regarding its physical qualities, particularly of expansion and contraction. His conclusions are most valuable, and stated with convincing clearness. He advances the theory that the cause of vulcanite's porosity is physical rather than chemical, and gives a simple and scientific technic for vulcanizing rubber. Extensive additions to the chapter on Esthetics embody the most recent thought on this subject.

The treatment of anatomical antagonization is particularly happy. A condensed resume of the immense volume of work now in progress in this field of study is followed by very complete recommendations for the practical application of the knowledge thus gained.

The plan of the work is most orderly. By successive steps the student is not only enabled to grasp the best thought in the field of prosthetic dentistry as well as the author's personality and system of practice, but is enabled to gradually assimilate the terminology of the subject and arrive at a complete grasp of its more complex aspects.

A most clear, concise, practical work for the student, with exceptionally illuminative illustrations, Prosthetic Dentistry is indispensable to the practitioner desirous of attaining a high degree of technical and clinical proficiency.

Local Anesthesia in Dentistry. With special reference to the Mucous and Conductive Methods. A Guide for Dentists, Surgeons and Students. By Professor Dr. Guido Fischer, Director of the Royal Dental Institute of the University of Marburg. Translated by Dr. Richard H. Riethmüller, of the Dental Department of the Medico-Chirurgical College, Philadelphia. Large octavo, 244 pages, with 115 engravings (mostly colored) and 2 plates. Cloth, $4.00, *net.* Lea & Febiger, Publishers, Philadelphia and New York, 1914.

Perhaps no book in recent years has met with such an enthusiastic welcome as Fischer's Local Anesthesia in Dentistry. The original American edition was absorbed very soon after publication, and one-half of this new edition has been sold within less than a month from the date of its appearance. Those who were so fortunate as to see Doctor Fischer's demonstrations of his methods during his recent visit to

America, will realize that while in this country he was constantly in close communication with the editor of the American edition, Doctor Riethmüller, and that the translation is therefore even more up-to-date than the latest German edition. The fields of operative dentistry and oral surgery have been in large measure revolutionized by the application of a safe and reliable local anesthetic. The genius of the author is shown in his ability to present the subject, as well as in his actual achievement, for he has told the story clearly, definitely and frankly and has treated each detail with satisfactory completeness. The illustrations and color-work are superb, and the mechanical features of the book are all that could be desired.

A Manual of Practical Hygiene. For Students, Physicians and Health Officers. By Charles Harrington, M.D., late Professor of Hygiene in the Medical School of Harvard University. Fifth edition, revised and enlarged by Mark W. Richardson, M.D., Secretary to the State Board of Health of Massachusetts, in collaboration with the following officials connected with the Massachusetts State Board of Health: W. H. Clark, Chief Chemist; X. H. Goodnough, Chief Engineer; William C. Hanson, M.D., Assistant to the Secretary; Herman C. Lythgoe, Chief Analyst of Food and Drug Department, and George H. Martin, formerly Secretary to the Massachusetts State Board of Education. Octavo, 933 pages, with 125 engravings and 24 plates in colors and monochrome. Cloth, $5.00, *net.* Lea & Febiger, Publishers, Philadelphia and New York, 1914.

The ever-increasing importance and the broadening scope of Hygiene are going hand in hand with the great strides which are constantly being made in our knowledge of the subjects concerned with preventive medicine. It is no longer possible for one man to have first-hand knowledge of all the parts of this vast field. To the end, therefore, that Harrington's Hygiene, in its new edition, might offer the latest information of high authority on every phase of its department, the editor has secured the collaboration of the experts associated with him in the work of the Massachusetts State Board of Health. This latest edition, therefore, is thoroughly representative, and to the smallest details, of this Board which has long been noted for the high character of its laboratory investigations and its public health administration. Many of the chapters have been practically rewritten, and in each case this has been done by a gentleman who has made a specialty of the topic under discussion. The revision has been extremely thorough throughout, and the new edition contains one hundred pages more than the previous one, as well as twelve additional plates.

Local Anesthesia. Its Scientific Basis and Practical Use. By Professor Dr. Heinrich Braun, Obermedizinalrat and Director of the Kgl. Hospital at Zwickau, Germany. Translated and edited by Percy Shields, M.D., A.C.S., Cincinnati, Ohio, from the third revised German edition. Octavo, 399 pages, with 215 illustrations in black and colors. Cloth, $4.25, *net.* Lea & Febiger, Publishers, Philadelphia and New York, 1914.

Professor Braun is one of the greatest, if not the greatest, authority on local anesthesia, and it is his work, especially in the perfection of technic, which has made possible the successful use of local anesthetics in general surgery and the surgical specialties. In this book the vague, erratic and unsatisfactory efforts which have been made in this field for many years are systematized, and a logical procedure, based upon scientific facts and having an exact and undeviating technic, is offered. The development of the various local anesthetic methods is demonstrated objectively, so that the reader will be able to make practical use of local anesthesia. This has been accomplished by descriptions of many operations performed under local anesthesia, with the aid of numerous illustrations, many of which are photographs taken during these operations. There is no doubt that brilliant results are being obtained almost daily with infiltration and conductive anesthesia, and the use of general anesthetics is being correspondingly reduced. Leaving the many other advantages of local anesthesia out of consideration, the total absence of mortality and injury to the tissues should give it a permanent and important place in surgery. Up to the present time the various surgical text books have given but little attention to local anesthesia, and the monographs have concerned themselves with special and individual methods. This work covers the whole subject completely and places the entire present knowledge thereof at the disposal of the profession. The illustrations are numerous, many are in colors, and many have been drawn by Professor Braun himself.

Diseases of the Heart. By John Cowan, D.Sc., M.D., F.R.F.P.S., Professor of Medicine, Anderson's College Medical School; Physician, Royal Infirmary; Lecturer in Clinical Medicine in the University of Glasgow; Examiner in Medicine, Royal Army Medical College. Octavo, 458 pages, with 199 illustrations. Cloth, $4.00, *net.* Lea & Febiger, Publishers, Philadelphia and New York, 1914.

This new work will be of great value, for it presents the most recent knowledge on this important class of diseases, and the latest methods of handling them. To quote from the preface: "During the last ten years great advances have been made in our knowledge of the diseases of the heart and arteries. New methods of histological technic have revealed lesions which were hitherto unappreciated, and experimental research has deciphered their causes. The sphygmomanometer, the polygraph, the electrocardiograph, and the Rœntgen rays, have become accessible to the clinician, and the data thus acquired have elucidated some of the many problems which awaited solution; while the pharmacologists have defined the uses of such drugs as digitalis more accurately than has been previously possible.

"The following pages are an attempt to review the whole subject in the light of these recent advances, and to present to the practitioner the results which have been attained, and their bearing upon the practical work of *diagnosis, prognosis and treatment.*"

The book is based largely upon the author's personal experience, though the best recent literature has also been carefully studied. Two of the chapters, upon special subjects, have been written by authorities in their particular fields. The illustrations are numerous, excellent and nearly all original.

First Aid Dentistry. By E. P. R. Ryan, First Lieutenant Dental Surgeon, U. S. Army. Philadelphia: P. Blakiston's Sons & Co., Publishers. Price, *net,* $1.25.

The author says: "This book has been designed for medical and dental practitioners and students, for nurses; and especially for hospital corps men of the military and naval service and for all who are called upon to administer relief from dental pain, where the services of a dental surgeon cannot be obtained.

"The impulse prompting this book was not to multiply books, but arose from the writer's belief and that expressed by many practitioners, both medical and dental, that this hand-book is needed by those it is intended to serve.

"The extent and scope of the methods described are limited to *First Aid,* which will relieve the patient from suffering until a dental surgeon may complete the treatment. A minimum number of instruments is recommended and their use shown and described.

"The methods used are simple and the descriptions have been written in the simplest words, technical terms being eliminated as much as possible; all methods used can be accomplished on board ship or in the field or in any hospital or medical office."

Dental Jurisprudence. An Epitome of the Law of Dentistry and Dental Surgery. By Elmer D. Brothers, B.S., LL.B., Professor of Medical and Dental Jurisprudence in the University of Illinois, and Lecturer in John Marshall Law School, Chicago. St. Louis: C V. Mosby Co., Publishers, 1914. Price, $2.00, *net.*

The author states that this work has been prepared with the view of arranging in concise and readable form those principles and rules of law which most affect the dentist in his individual and professional capacity. It is a development of a course of lectures which the writer has been delivering to classes of dental students since 1895, and embodies what he found most useful and interesting to the progressive, inquiring mind of the student. It is believed the work will be instructive to any practitioner who desires to inform himself on this very important subject.

Most practitioners have had almost no instruction on their professional rights and responsibilities under the law, and it is believed that in this epitome they will realize the information they may seek.

The author says that he has purposely confined himself almost exclusively to the legal aspect of the questions involved, in the belief that the dental phase is sufficiently covered in other courses; in other words, a knowledge of modern dentistry—its achievements and efforts—is assumed.

While most of the references are to medical cases, the principles involved are equally applicable to dental practitioners.

Dental Radiology. By Francis LeRoy Satterlee, Jr., A.M., D.Sc., Assistant to the Professor of Physics, Chemistry and Metallurgy; Lecturer on Physics; Lecturer on Radiology; Director of Practical Physics Laboratory; Director of X-ray Laboratory; Chief of X-ray Section of the Clinic, New York College of Dentistry. New York: Swenarton Stationery Company, 121 E. 27th Street, Publishers.

This book is not a treatise on X-ray in general, but rather of its use in connection with modern dentistry and is primarily for the dental student.

The author tells of the investigations and discovery of the X-ray, then of the various rays, their nature, characteristics and applications, X-ray tubes, and general technic of preparing films, taking the picture, developing and mounting negatives, etc. A concise and practical treatise on the different phases of dental radiology.

The book is illustrated with many engravings and is well printed and bound.

Essentials of Orthodontia, with especial reference to nomenclature, including an outlined course in practical technics for students. By Van Broadus Dalton, D.D.S., Professor of Orthodontia, Exodontia and Anesthetics, Ohio College of Dental Surgery; Member of the American Society of Orthodontists; Member of the National Dental Association; Member of the Ohio State Dental Society; Member of the Cincinnati Dental Society; Member of the Cincinnati Dental Research Society. Philadelphia: P. Blakiston's Son & Co., 1012 Walnut Street, Publishers, Price, *net,* $1.25.

In this book the author has confined his writing to the essentials of orthodontia. Chapter I is devoted to nomenclature. Chapter II, to Occlusion. Chapter III, Etiology. Chapter IV, Facial Art. Chapter V, Impression and Model-making. Chapter VI, Band-making and Soldering. Chapter VII, Methods and Appliances. Chapter VIII, Retention.

The book contains 100 pages of text and is illustrated with good engravings.

How to Collect a Doctor Bill. By Frank P. Davis, M.D., Secretary Oklahoma State Board of Medical Examiners, 1908-11; Superintendent Oklahoma State Institute for Feeble Minded, 1910-11; Member of County, State and American Medical Associations; Member American School Hygiene Association; Member State and National Eclectic Associations; Member Oklahoma Association of Charities and Corrections; Member Oklahoma Press Association; late Editor Davis' Magazine of Medicine, etc. Enid, Oklahoma: Frank P. Davis, M.D., Publisher. $1.00, *net.*

In his preface the author says: "My excuse for presenting this little book to the profession is that I have often felt the want of just such information as is herein contained. In fourteen years of practice I have made it a point to study my patients and the business problems that confront the man in our profession. Some of the things that I have learned are embodied in this book. Taking my professional experience as a whole I have collected over *ninety per cent. of my accounts.*"

The subjects treated are: The Successful Physician; Attitude Toward Debtors; Proper Time to Collect; Books and Bookkeeping; Letters and Forms; Statutes of Limitations; Exemption Laws and Their Application; Extracts from Exemption Laws of All States.

There is much information in this little book, and it is just as good for the dentist as for the physician. It is worth more to any dentist or physician than the price of the book.

SOCIETY·ANNOUNCEMENTS

New Jersey Board of Dental Examiners

The New Jersey State Board of Dental Examiners will hold their regular business meeting and examinations in the assembly chamber of the state house, Trenton, N. J., December 7, 8 and 9, 1914.

License fee, $25.00. No interchange of license. Practical tests required in addition to the theoretical examination are: One gold filling in the proximal surface of a tooth; also a bridge consisting of three or more teeth, exclusive of abutments, and one Richmond crown (gold metal), both practical cases, mounted and articulated. Applications must be filed *complete* with the secretary at least ten days before the date of the examination.

Attention is called to the following: All applicants for a license to practice dentistry in New Jersey, "shall present to said board a certificate from the superintendent of public instruction showing that before entering a dental college, he or she had obtained an academic education consisting of a four-years' course of study in an approved public or private high school or the equivalent thereof."

In accordance with the above ordinance the secretary will issue application blanks to applicants only upon presentation of the required certificate from the superintendent of public instruction, Trenton, N. J.

For further particulars apply to ALPHONSE IRWIN, D.D.S.,
Secretary,
425 Cooper St., Camden, N. J.

Indiana State Board of Dental Examiners

The next meeting of the Indiana State Board of Dental Examiners will be held at the State House, Indianapolis, commencing Monday, November 16th, and continuing five days. For application blanks and full particulars, address DR. FRED J. PROW, *Sec'y.*,
Bloomington, Ind.

Michigan State Board of Dental Examiners

The semiannual meeting of the Michigan State Board of Dental Examiners will be held in the Dental College at Ann Arbor, commencing Monday, November 9th, and continuing through the 14th. For full particulars and application blanks, address F. E. SHARP, *Secretary,*
Port Huron, Mich.

Wisconsin State Board of Dental Examiners

The Wisconsin State Board of Dental Examiners will convene in Milwaukee at Marquette University on December 14, 1914, at 10 A.M., for examination of applicants to practice in Wisconsin.

High school diploma, application and $25.00 fee to be filed with the secretary ten days prior to above date.

Dental diploma to be presented in advance of the examination.

Junior dental students presenting a clear card for two years' unconditional work from a reputable dental college and filing a high school diploma, or its full equivalent, will be permitted to participate in the theory examination in the following six major subjects: Anatomy, Physiology, Histology, Chemistry, Bacteriology, Materia Medica. The grades made in these subjects will be credited at subsequent examinations.

Special application blanks for this examination and $10.00 fee, together with high school credits, to be filed ten days in advance.

S. H. CHASE, *Pres.*,
1404 Majestic Bldg., Milwaukee, Wis. W. T. HARDY, *Sec'y.*,

Pennsylvania State Board

The next examination of the Pennsylvania Board of Dental Examiners will be held in Philadelphia and Pittsburg on Wednesday, Thursday, Friday and Saturday, December 9, 10, 11 and 12, 1914. Application blanks can be secured from the Department of Public Instruction, Harrisburg. For further information, address the secretary.

ALEXANDER H. REYNOLDS, *Sec'y.*
4630 Chester Ave., Philadelphia.

Southwestern Michigan Dental Society

The next annual meeting of the Southwestern Michigan Dental Society will be held in Kalamazoo, Tuesday and Wednesday, December 8th and 9th, at the Park-American Hotel. The officers of the society will put forth every effort to make this meeting one that is worth while, and in order to do so we are going to call upon each and every member to assist us. Instead of having the time-honored papers read, we are going to ask you to choose your own subject, and we will bring some good men here to give you a post-graduate course. This will be decided by the majority of requests. We feel that in this way everyone will be satisfied, and will come to the meeting prepared to stay with us every minute.

In order to facilitate matters, we are attaching a return card, which you are to fill out and send in at once, choosing your subject or offering any suggestions. Do not delay this a minute, but sit down and answer it at once. We must act quickly.

Don't forget the date—Tuesday and Wednesday, Dec. 8th and 9th.

Iowa State Dental Society, Northwestern District

The Northwestern District of the Iowa State Dental Society will hold a clinic and manufacturers' exhibit at the Martin Hotel, Sioux City, Ia., November 30th and December 1st.

Nearly all of the leading manufacturers have signified their intention of having a representative present with a full line of exhibits.

The following men will appear on the program: Dr. T. B. Hartzell, Minneapolis, pyorrhea clinic and paper on *Secondary Infection;* Dr. W. H. MacNeil, Minneapolis, paper and clinic on *Conductive Anesthesia;* Dr. T. J. Kirby, Holton, Kan., paper on *Dental Economics.*

A banquet and special entertainment will be a special "feature."

C. E. Westwood, *Sec'y.*

Those Wishing to Register in Indiana, Please Notice

In compliance with Section 9, an Act to regulate the practice of dentistry in the state of Indiana, approved March 8, 1913.

On or before the thirty-first day of December of each year each dentist now licensed or subsequently licensed to practice dentistry in this state shall transmit to the Secretary of the State Board of Dental Examiners his signature and address, together with the fee of one dollar and the number of his or her registration certificate, and receive therefor a renewal license certificate. Said renewal license certificate shall be at all times properly displayed in the office of the one who is named in the license, and no person shall be deemed in legal practice who does not possess such renewal certificate. Any license granted by said board shall be cancelled and annulled if the holder thereof fails to secure the renewal certificate herein provided for within a period of three months after December 31st of each year; *provided,* that any license thus cancelled may be restored by the board upon the payment of a fee of five dollars, if paid within one year after such cancellation.

Notices will be mailed to all dentists registered in Indiana to their last known address, on or before December 31, 1914. Failure to receive such notice will not be an exemption or an excuse for non-payment. In such cases, all persons should notify the secretary, giving their correct address. This also applies to all those living outside the state.

Respectfully,

Bloomington, Ind. Fred J. Prow, *Sec'y.*

Michigan Licentiates, Please Notice

The licenses of all Michigan licentiates, whether practicing in the state or not, who have not paid their annual registration fee, will be revoked at the next regular meeting of the board, which will be held in Ann Arbor, November 9th to 14th. F. E. Sharp, *Secretary,*

Port Huron, Mich.

NOTICE!

Meeting of the National Association of Dental Faculties

The National Association of Dental Faculties will hold its meeting on the twenty-sixth and twenty-seventh of January at Ann Arbor, Mich., Headquarters, the Allenel Hotel.

This meeting will precede the Teachers' Association meeting, which will be held from the twenty-eighth to the thirtieth. Besides the regular business there will be several papers of interest to educators read before the association.

The executive committee meets at nine o'clock, Tuesday the twenty-sixth. Regular session will open at ten.

B. Holly Smith,
Chairman of Executive Committee.
Charles Channing Allen,
Secretary.

Ohio State Dental Society

The Forty-ninth Annual Meeting of the Ohio State Dental Society will convene in Columbus, December 1st, continuing through the 2d and 3d. Papers on live subjects by able men on Tuesday and Wednesday afternoon; clinics Wednesday and Thursday forenoons.

Boost

Boost, and the world boosts with you,
Knock, and you're on the shelf,
For the world gets sick of the one who'll kick,
And wishes he'd kick himself.

Boost when the sun is shining,
Boost when it starts to rain.
If you happen to fall, don't lie there and bawl,
But get up and boost again.

Boost for your own advancement,
Boost for the things sublime,
For the chap that's found on the topmost round
Is the booster every time.

THE DENTAL SUMMARY

THE MAGAZINE THAT HELPS

Vol. XXXIV DECEMBER, 1914 No. 12

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The Michigan State Dental Society
The Indiana State Dental Society
The Kentucky State Dental Society
The Louisiana State Dental Society
The West Virginia State Dental Society
The Northern Ohio Dental Society
The Northern Indiana Dental Association
The Eastern Indiana Dental Society
The Southwestern Michigan Dental Society
Odontological Society of Western Pennsylvania
The Lake Erie Dental Society
and Several Local Dental Societies

Editorial Office: 195 16th Avenue, Columbus, Ohio
L. P. BETHEL, M. D., D. D. S., Editor-in-Chief

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REGULAR CONTRIBUTIONS

THE CONSERVATION OF THE ALVEOLAR PROCESS WITH SPECIAL REFERENCE TO LESIONS IN THE MOUTH

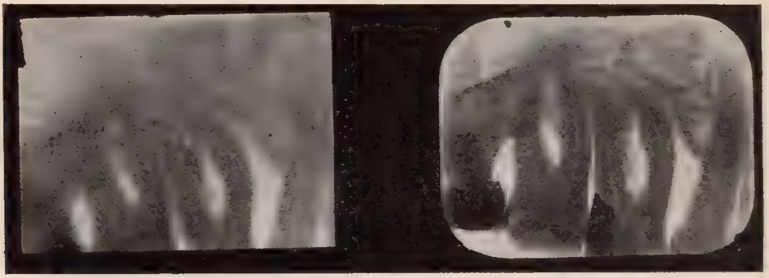
BY M. H. CAZIER, M.D., CHICAGO, ILL.

TEXT WRITERS for a score of years have been pointing out the fact which was first announced by Dr. Eugene S. Talbot, of Chicago, and which announcement human experience corroborates, that the alveolar process is a *transitory structure*, and that it disappears by absorption after middle life. As far as the author is informed, there is no where in the literature of the subject any suggestion of the cause of said defect, coupled with any method for its removal. The author hopes in this paper to disclose the cause of the disappearance of this structure and likewise to show the great damage to the individual resulting from the absorbing process.

To point out a simple and rational method by which said cause is removed and the bony support of the teeth made as permanent as other structures to remain in full function until final dissolution of the body occurs.

Reference is had to the accompanying X-ray pictures, showing the effect of ten months' practice of oral hygiene on the bony support of the teeth. A large number of cases are now under observation for later report.

The alveolar process of the maxilla, together with the subsidiary supporting tissues of the teeth, derive their nourishment through arterial spurs given off from the main arteries of the jaw. Talbot[1] has pointed out that the alveolar process is an "end organ." The nourishment received by the tissues is limited, as would be the water supply of a family living in a house situated on the distal end of the water main. The pressure is always scant and entirely fails when any unusual demand intercepts the family needs. Nutrition of the alveoli is never abundant, and is greatly reduced by any disturbance of the usual distribution of nutriment through the blood stream, by pregnancy, severe illness or nervous strain, also by loss of the normal resiliency of the vascular system, due to age or to other causes. The observation of practitioners in medicine and dentistry is that in these conditions mouth lesions gain great headway. The explanation is found in the fact that the bony tissue is undergoing starvation.


Sept. 1913 July 1914

This is particularly true of the peripheral margins of the alveoli, fed on the very distal extremities of the attenuated vessels; they suffer first and most acutely, and it so happens that this very peripheral marginal portion, where vital resistance is reduced the most, is the portion most exposed to attacks of bacterial flora which assemble under the gingival margins; the tissue being vulnerable, invasion is easy. The result is the very prevalent malady known as pyorrhea. The prevalence of this disease together with the admitted transitory character of the alveoli, makes certain the relation of cause and effect. The author therefore classifies the causal factors of pyorrhea as follows:

Primary: Reduced vital resistance of the bone.
Secondary: (*a*) Irritation.
(*b*) Accretions of tartar and debris.
(*c*) Bacterial invasion.

Measures devoted to the removal of the secondary factors, the product of degenerative changes, deposits, detritus, etc., ignoring the basic causal factor, must of necessity be followed by relapse, even though all irritation could be removed, conditions would progress about the same, degenerative change unchecked causes the bone to recede and the gums follow. Specially skillful practice may be employed, patient becomes a regular repeater; finally after years of pain and penalty the teeth are lost, and the dictum that the disease is incurable finds renewed strength and confirmation.

---

[1] Interstitial Gingivitis

VARIETIES

Intercurrent sysmetic affections sometimes alter the physical appearance of the lesions; this has led to a multiple classification, viz., rheumatic, syphilitic, gouty and other varieties of pyorrhea and has given rise to the desire to combat each variety with its appropriate vaccine. We should not be misled by names. Causes and realities must be given consideration.

When oral sepsis has led to secondary infection and metastases, vaccines are of much value, and careful study by a competent internist is the correct procedure whenever constitutional disorder is present; but for the local lesion, vaccines without the removal of the deposits and the correction of the error in nutrition are without value, and with such removal and correction they become entirely unnecessary. Space prevents the recital here of the damaging constitutional infection resulting from oral sepsis. Current dental and medical literature is, however, replete with such recital of arthritis, nephritis, endocarditis, etc.; readers are referred thereto.

TREATMENT

The proper removal of the deposits constitutes an essential feature of local treatment and is of much importance for recovery is dependent upon its success. Instrumentation in well trained hands is the appropriate practice so far as the physical limitations admit of safe procedure, but beyond this in bifurcations and curvatures needless destruction of the pericemental tissue results, a remnant of deposit is frequently left and the history, of course, is disappointing.

From the standpoint of conservation it seems wise to limit the operative procedure to safe lines and to rely on chemical solvents in all other cases; this practice is now receiving much attention; its details are fairly well worked out and it is worthy of further and serious attention.

The most important part of the local treatment, however, is to correct the defect in nutrition, for unless this is done we have not removed the cause and of course results are temporary.

Systematic cupping of the jaw for the double purpose of cleansing and nourishing is the plan the author has found most effective, and when properly employed in connection with the removal of the secondary causes there is little left to desire except that the treatment might have been instituted earlier. The cupping should be practiced night and morning, the patient being properly instructed; flexible cups of various sizes, to be had in the market, used with some appropriate suction device, combine to make the treatment available. The suction, if intermittent, produces massage and drainage; when allowed to be continuous it induces a fullness of the arteries which amounts to hyperemia of the reparative type, and results in a final restoration of tissue, soft and hard, to an appreciable extent which evidences that absorption is checked.

Preceding any treatment of lesions in the mouth, the cupping operation prolonged from three to five minutes reduces congestion and tenderness, removes debris, and makes exploration and treatment more feasible; practiced night and morning by the patient it drains off the stagnant blood together with accumulated pus and food remnants, prevents oral sepsis, and with the removal of secondary causal factors, results in the eradication of suppurative inflammation, followed by the solidifying of loose teeth, the *conservation of the alveolar process* and the general well being of the patient.

Cupping to produce hyperemia of the jaw is recommended by Prinz,* but he suggests no means of producing alternating drainage and massage. His plan does not contemplate a cup to cover the entire jaw, but only a few teeth and molded for each case separately, while the author's plan connects a flexible mouth cup, covering the jaw, with a suction device adapted to produce alternating drainage, massage and hyperemia. The cups are of universal application, different sizes being the only required variation.

Dr. James E. Keefe, of Chicago, some years since, made known his original study and use of similar appliances, but, like Prinz, his quest was for hyperemia. His appliance admitted of no drainage and produced no massage.

Dr. James W. Dennis, of Cincinnati, constructed rubber cups to enclose the teeth and the gum. He limited the use of his appliance to the injection of antiseptic fluids through connecting tubes.

The author uses cups somewhat similar in structure to those of Dr. Dennis, but instead of injecting fluid he produces vacuum by a device, either of cylinders or a syphon, and attaches a device to enable a user to interrupt the suction at will, which provides an alternate grip and release, making an effective massage and insuring drainage; then allowing the suction to be continuous, vacuum and hyperemia are produced at will.

To recapitulate: The treatment suggested consists in cleansing by drainage, stimulating by massage and feeding by hyperemia; it discourages indiscriminate drugging and especially the use of iodine and its derivatives, which tend to aid the retrograde or absorbing process.

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*Dental Therapeutist, page 421.

551 Washington Boulevard.

> Man was made for action, not for rest. In action is his sole and only power. Not in the things he accomplishes, but in his workings, he is great. This every great mind has known. If called upon to choose between happiness and the pursuit of happiness, every great mind would choose the pursuit.

RESTORATIONS IN PORCELAIN, FUSED AND BAKED*

BY H. B. TILESTON, D.D.S., LOUISVILLE, KY.

RESTORATIONS DONE IN PORCELAIN are the embodiment of the highest art in prosthetic and operative dentistry. They represent the aristocracy of all dental operations.

William Morris said: "Art is not a thing; art is a way;" and Elbert Hubbard says, "Art is a matter of imagination."

Before one can produce the thing artistic one must see a vision, and having seen it, must have the materials from which the child of his imagination may be fashioned before one can find the way of art.

High class goods can be made only from high class materials. You cannot make a silk purse out of a sow's ear. Crude indeed were the earliest attempts to supply lost teeth with such materials as wood, brass, bone or ivory. When Fauchard, in 1728, suggested the idea, though he may not have carried it out, of making artificial teeth out of porcelain, and when, in 1774, Duchateau invented the first hard porcelain teeth, which were first fashioned into a denture by DeChamant, dental prosthesis received an upward impetus which culminated finally in the most artistic of all its achievements, the continuous gum plate perfected by Dr. John Allen in 1846. Nothing in prosthetic dentistry has gone beyond this. The unfortunate truth is that the later methods introduced have been retrogressive and the present state of the art, as generally practiced, is nothing to be particularly proud of. Without porcelain, bridge work would be a hideous travesty upon nature and single crowns as unsightly as unnatural.

The acme of perfection, both as to natural appearance and artistic beauty is attained in the porcelain baked crown with platinum base, especially where the entire crown is built up and carved out of high fusing body. Where a stock facer is used its artificiality may be quite effectually concealed by the use of high fusing porcelain colors.

By the skillful use of these porcelain paints it is possible to imitate the peculiarities of pigmentation in the adjacent natural teeth so perfectly as to defy detection. In all these methods of porcelain replacement the results surpass anything possible by other means simply because the materials are of such a character as to lend themselves readily to skillful and artistic manipulation.

RESTORATIONS OF PARTS OF TEETH

What has been said concerning the replacement of whole teeth, or sets of teeth, is true also of restorations of parts of teeth with porcelain, such operations representing the highest order of artistic excellence when well done. The phrase, "when well done," carries a world of meaning, for, so exacting are all the procedures of technic in the making of a porcelain inlay that, even though the properties of the material itself make perfect results possible, few there are who are capable of approaching perfection. Some fail because they are not endowed by nature with the capacity for such work, and many fail because they are unwilling to spend themselves upon the accuracy of detail which is essential to success. Haweis, a noted musician and critic, expresses this thought admirably when he says: "Many a clever artist has failed because, in the pride of youthful facility, he has declined the method and drudgery of a correct technic."

---

*Read before the Rehwinkle Dental Society, Chillicothe, O., 1914.

HIGH AND LOW FUSING BODIES

High and low fusing bodies each have their enthusiastic advocates who confine their operations to one or the other, while there are those who are eclectic in their practice, employing one or the other as its peculiar properties recommend it for a specific purpose. The latter method is the most rational as indeed eclecticism is always, in any line of practice, the most rational.

The successful man is the one who makes intelligent selection from all available materials and methods, appropriating this from one and that from another, as the needs of the case in hand seem to require.

The high fusing porcelain, being stronger and more translucent, is best for restoring incisal corners and edges and for approximo-occlusal contours in molars and bicuspids, while the low fusing bodies are peculiarly applicable to labio- and bucco-gingival cavities. The latter may also be used in cavities of class three, but the high fusing will generally give more satisfactory results.

The chief advantages in the use of the platinum matrix, which of necessity must be employed when high fusing porcelain is used, are that it is not necessary to invest it and it can be returned to the cavity after the first baking and any distortion corrected. After the first bake, which should be carried past the biscuit state, no further distortion is apt to occur.

Cavity preparation for incisal corner restorations calls for careful study and planning. Various forms have been suggested to provide for resistance to stress, but the most reliable is the incisal step, which should provide for sufficient thickness of porcelain to withstand the force of incision. Another important point is to so shape the cavity that the porcelain will present a square angle at all margins exposed to stress to avoid fracture. When a cavity of this class has been properly prepared, the matrix and the finished inlay can be passed in and out in a straight direction from the incisal and consequently it is one of the easiest cavities into which to adapt a matrix—much easier than in a cavity of class three.

Numerous devices have been suggested for holding the platinum fixedly while being adapted to the cavity. The simplest and one of the best is a loop of silk ligature floss passed over the partly adapted matrix and held taut with a finger of the left hand while the burnishing is completed with the right. This device also serves to hold the matrix firm while being corrected after the first bake.

Getting correct color effects is largely a matter of intuition, or perhaps inspiration, aided of course, by experience. This is by far the most fascinating part of porcelain inlay work. The overlaying of colors so as to get a blend, a modifying or intensifying of color effects, gives the most artistic results. In the majority of cases it is safe to use a yellow for the body of the inlay upon which the desired shades may be built up, as yellow is the fundamental color in most teeth. In overlaying this basic color to work up the desired shades, the yellow should be brought out rather strong in the gingival third while the incisal portion is strongly marked with blue, which results in a suggestion of green where the yellow and blue blend together. Green is a more prevalent shade in natural teeth than it appears to be upon casual observation. If the colors seem to be coming up too strong, they may be toned down in the last layer by using lighter shades of the same colors. It is better to have the colors in the porcelain slightly more pronounced than in the natural enamel rather than lighter.

In cavities of class three where the porcelain shows only slightly upon the labial face of the tooth and at such an angle that light is not reflected straight forward, it is better to have the porcelain somewhat lighter in color than the tooth.

USE OF PINK PORCELAIN

In labio-gingival cavities the low fusing porcelain can be used with greater facility than the high fusing. The gold matrix is easily adapted to this class of cavities, and when packed tightly with camphor gum, then lifted out and invested in ground asbestos, it will not change shape in the process of baking.

In the case of a gingival cavity which is accompanied by much recession of the gum, the cavity including the exposed root, a very artistic effect may be produced by using pink enamel down to the natural gum line, the rest of the inlay being made of enamel to match the tooth at that part. The pink body should be built up thick enough to form a margin and festoon like the natural gum. Such treatment takes away the elongated appearance of the tooth and the result is quite pleasing.

SETTING OF INLAYS

The cementing of porcelain inlays is conceded to be the weak point in this class of work. If the cavity is so shaped as to retain the inlay against the stress that falls upon it in use, the cement fulfills the function of hermetically sealing the joint and oxyphosphate of zinc is sufficiently adhesive to hold such an inlay in place indefinitely. Inlays that depend entirely upon the cement for their retention, such as labial or buccal cavities and most approximal cavities in incisors, are very apt to drop out sooner or later. The opacity of zinc cement is a serious objection also, for on account of it, the color of an inlay is often changed so profoundly as to make an otherwise excellent operation an artistic failure. The joint line is also made conspicuous by the cement, though this disappears in time as the cement washes out. A practical translucent cement is yet to be produced. Pinches is some improvement over the ordinary zinc cements, but it appears to lack strength. An ideal cement for porcelain inlays, as far as appearances go, is a silicate cement, which makes an invisible joint and does not alter the color of the inlay, but its lack of adhesiveness makes it uncertain as a permanent retainer.

Lee Smith & Son's new "Translucin," a silicate cement, is claimed by the makers to have marked adhesive properties. I have set several inlays with it, which, as far as appearances go, seem very satisfactory. When mixed thin enough for this purpose, however, it sets very slowly and I am not certain as to its permanence.

CHEMICAL PORCELAIN

The silicate cements have taken their place among filling materials as a valuable addition to the armamentarium of the operative dentist, but to be used with discretion. This material makes an excellent substitute for baked porcelain in cavities of class three which are so difficult with porcelain and comparatively easy with silicate, but it is not strong enough to be used for incisal corner restorations. In labio- and bucco-gingival cavities it gives excellent results if the field of operation can be kept dry long enough to fulfill the requirements. It also does surprisingly well in occlusal cavities in molars and bicuspids and presents a much more pleasing appearance than anything else.

Silicate cements are not, however, insoluble, as their makers claim them to be; at least, they are not in some mouths, and they sometimes discolor badly. These faults may be due largely to improper manipulation. This material is very exacting in the technic of its proper use and he who, looking upon it as an easy thing to handle, slights any of the requisites to its successful manipulation, invites failure and is sure to have the invitation accepted.

The more recent products of the manufacturers have eliminated some of the objectionable features of the first material brought out, with the result that they seem to be more permanent and less liable to discolor.

It seems reasonable to expect that still further improvements will be made until out of this material or some modification of, or outgrowth from it, will finally be developed the ideal filling.

It has already become indispensable in the practice of a large number of dentists, and if nothing better can be said of it, it may certainly be hailed as the best plastic filling material we have ever had.

There is one thing peculiar about both fused and chemical porcelain fillings, and that is that secondary decay seldom if ever occurs about them. The cement may dissolve out to considerable depth between the tooth substance and a porcelain inlay or a silicate filling may disintegrate until it is half gone, and yet no caries supervenes about them. There seems to be something about these materials which is evidently inhibitive to the growth of bacteria in their immediate neighborhood.

Imperfections appearing about a porcelain inlay through chipping of the filling or the enamel of the tooth, or both, may be happily restored by patching with silicate cement. The addition can be made practically invisible and may save the inlay from further damage or ultimate loss.

This paper is necessarily somewhat sketchy in its treatment of the subjects included in its title for the reason that a comprehensive exposition of either one of them would extend to inordinate proportions a paper already too long.

I presume that I am addressing practitioners already familiar with the details of procedure which I have had to omit. My purpose has been to revive an interest in methods of practice of a high order of excellence, which at one time were very popular but which for some reason, have fallen into desuetude more or less general. This neglect of a noble phase of our art may be the natural reaction of a one-time fad which may be coming back ere long to its own, or it may be traceable to the tendency nowadays to take the easiest way—the public laboratory way—and to shun any character of operations which are too exacting and intricate to be referred to the laboratory man.

Restorations in porcelain are for the dentist who cares and are for the patrons who care, and no others can be reasonably expected to take an interest in them.

ANATOMICAL ARTICULATION

BY R. W. BURCH, D.D.S., BROWN CITY, MICH.

WHAT IS THEORY TODAY may be fact tomorrow. We are all more or less familiar with the theory of anatomical articulation. We have heard that the slant of the condyle paths, the correct placing of models on the articulator and the adjustment of "rotation points" of the articulator all have more or less influence on the proper articulation and practical functioning of dentures.

Just how much of practical value may be derived from these considerations depends largely upon the mechanical means at hand for dealing with them. It is obvious that the bridge between theory in anatomical articulation and the realization of its facts depends upon the exactness and the simplicity of the mechanical apparatus obtainable for the operation. To more nearly approximate the simplicity and exactness required I have found it necessary to construct a new form of articulator. I therefore beg to present it in the discussion of this subject. However, this does not imply the discovery and exploitation of new principles but rather the coming of old discoveries and principles into similar apparatus.

There are essentially three factors in obtaining anatomical articulation.

First, the plaster models must be correctly placed on the articulator. They must be so placed in relation to the joints of the articulator that similar distances and relations in the individual case will be duplicated.

Second, the exact slant of the condyle paths must be measured, and the same degree of inclination given to the "condyle paths" of the articulator.

Third, the rotation points of the mandible must be located, and the articulator adjusted accordingly. The average distance between the rotation points is about four inches, but where considerable variation to this average can be detected the articulator should be adjusted to meet these conditions.

The subject of taking the bite is not necessarily a part of anatomical articulation, but due to its close relation and the great importance of this step I will make an explanation of my method.

The manager of a large dental laboratory in Chicago tells of a dentist from a small western town who sent in upper and lower impressions for plates, but sending no bite at all. Upon being informed that a "bite" was necessary, the manager asserts that his directions were to use "just a medium bite." The so-styled "mush-bite" or "biscuit bite" is an improvement on the "medium bite," but it is so objectionable that it should positively never be used. It is not saving time to take chances. Each step in the technic of all operations should be exact in results.

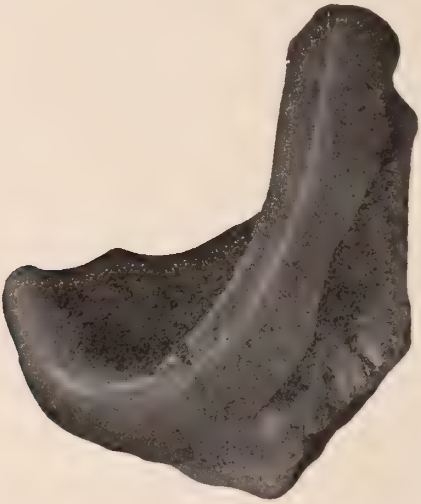

Fig. 1.

The following method of taking the bite is not a new one; it is a time-tried method, and it is one which will prove to be time saving when once properly worked out. The impressions should be trimmed and poured up, making strong models. These should be carved and trimmed into as nearly the shape and size of the plate to be made as is practicable. One very obvious objection to the "mush-bite" is the tendency of the patient to bite to one side, or to protrude the mandible when biting on a large piece of wax, but this is not the most serious objection. Inasmuch as the wax used is more difficult to adapt to the alveolar ridge than is the material used in taking impressions, that is, the biting pressure differs from the pressure exerted on the material used in taking impressions, therefore, models do not fit accurately into the bite wax.

Some form of base plate should be used. Metallic base plates are very convenient for this reason, but when none are to be used a piece of hard modeling compound may be warmed and made into a sheet about twice the thickness of a piece of plate wax. Adapt this to the models as closely as is possible, and trim into the exact shape of the plate desired.

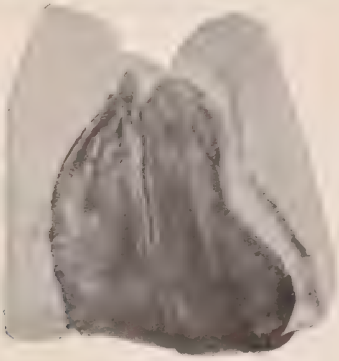

Fig. 2.

To strengthen the lower base plate, heat a piece of bent wire and place it upon the lower compound to cool. These stiff base plates are essential in taking the bite. Place the upper one in the mouth and get an estimate of the general shape and size of the upper trial plate. Then build up the base plate with soft bees wax. (Fig. 1.) Try this in the mouth until the proper length, contour and approximate occlusal surface is formed. Complete the bite by placing bees wax on the lower base plate, using the upper trial plate in the mouth to force the soft bees wax of the lower into the approximate bite relations. Trim the lower trial plate to match the upper (Fig. 2). Grease the occlusal surfaces with vaseline to keep them from adhering to each other, and cause the patient to move the jaws as though chewing until the true occlusal surface is more fully worked out. It will be observed that when the jaw is completely at rest the bite relations are absolutely established. These relations should be indicated on the wax and thus maintained. If the line of occlusion could be fully determined

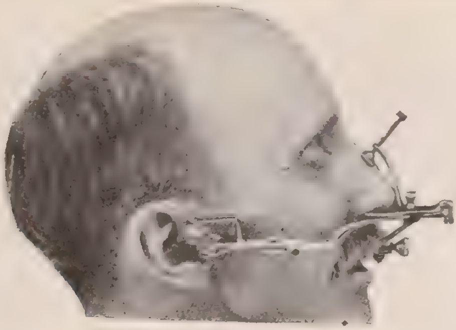

Fig. 3.

in this manner the need of an anatomical articulator would be less urgent, but the plane of occlusion so worked out may not be parallel to the line passing through the rotation points of the mandible. Again, the proper antagonizing of opposing cusps can only be brought out by passing these cusps through arcs of circles, determined by exactly placed rotation points. To correctly mount models on the articulator, some form of face-bow must be used. (Fig. 3.) The face-bow is operated from the forward thumb screw. It is firmly held in position by the ear pads and the nose pad. A greater degree of accuracy may be obtained by its use in this way, and the lower section may be added to complete the articulation, as shown in Fig. 7. To measure the inclination of the condyle paths, and to determine the location of the rotation points of the mandible, the lower section is added as shown in Fig. 5. The lower wax plate is held firmly in position by this lower bow, and when the patient swings the mandible from one side to the other, the condyle paths on the articulator are set as this movement indicates. To locate the rotation points of the mandible is an equally simple operation, but it is not so simple to explain.

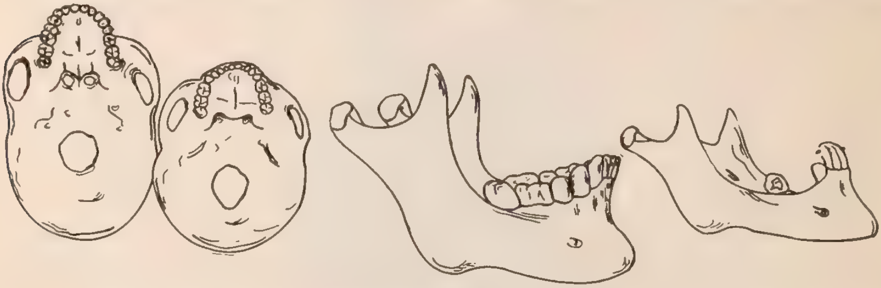

Fig. 4—Tracings from actual photographs of comparative sized skulls and mandibles showing the great variation possible in different individuals.

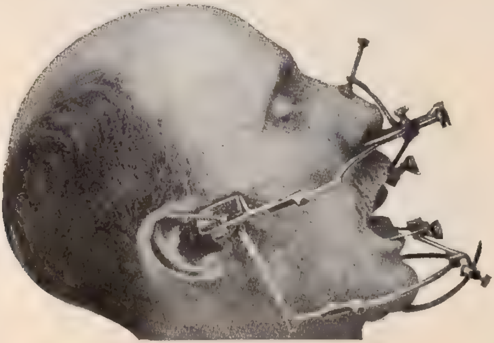

Fig. 5.

Fig. 6 represents a part of the explanation necessary, but while such a lengthy procedure need not be entered into in each specific case, the figure will serve to point out the experimental value of the instrument. A much simpler solution may be mentioned; that is, that the triangle being practically equilateral, ad the lateral movement of the mandible measured on

Plate A being a constant amount, the amount of movement at the sleeve joint of the lower frame, indicated by B on the sleeve and C on the arm, will be directly proportional to the location of the rotation points. Thus each graduation of arm C is made to indicate one turn of the thumb nut which moves the "rotation points" or joints of the instrument into the precise location. After removing the instrument from the jaw, and approximating the "rotation points" as thus indicated by the graduation of arm C, screw the cross bars into position and plaster the models to them,

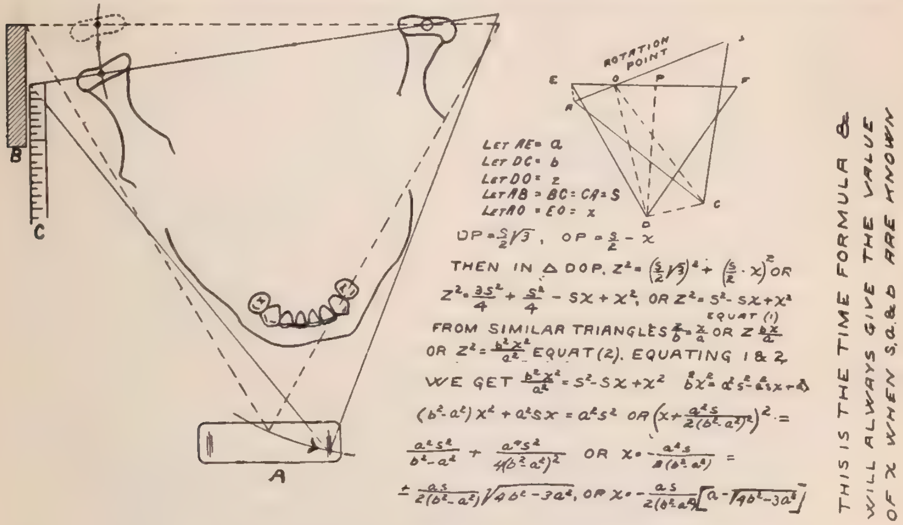
B
C
A
ROTATION POINT
E
O
P
F
A
C
D
LET AE = a
LET DC = b
LET DO = z
LET AB = BC = CA = S
LET AO = EO = x
$DP = \frac{S}{2}\sqrt{3}$, $OP = \frac{S}{2} - x$
THEN IN △ DOP, $z^2 = \left(\frac{S}{2}\sqrt{3}\right)^2 + \left(\frac{S}{2} - x\right)^2$ OR
$z^2 = \frac{3S^2}{4} + \frac{S^2}{4} - Sx + x^2$, OR $z^2 = S^2 - Sx + x^2$ EQUAT (1)
FROM SIMILAR TRIANGLES $\frac{z}{b} = \frac{x}{a}$ OR $z = \frac{bx}{a}$
OR $z^2 = \frac{b^2x^2}{a^2}$ EQUAT (2). EQUATING 1 & 2
WE GET $\frac{b^2x^2}{a^2} = S^2 - Sx + x^2$ $b^2x^2 = a^2S^2 - a^2Sx + a^2x^2$
$(b^2 - a^2)x^2 + a^2Sx = a^2S^2$ OR $\left(x + \frac{a^2S}{2(b^2 - a^2)}\right)^2 =$
$\frac{a^2S^2}{b^2 - a^2} + \frac{a^4S^2}{4(b^2 - a^2)^2}$ OR $x = -\frac{a^2S}{2(b^2 - a^2)} =$
$\pm \frac{aS}{2(b^2 - a^2)}\sqrt{4b^2 - 3a^2}$, OR $x = -\frac{aS}{2(b^2 - a^2)}\left[a - \sqrt{4b^2 - 3a^2}\right]$
THIS IS THE TIME FORMULA & WILL ALWAYS GIVE THE VALUE OF X WHEN S, a & b ARE KNOWN

Fig. 6.

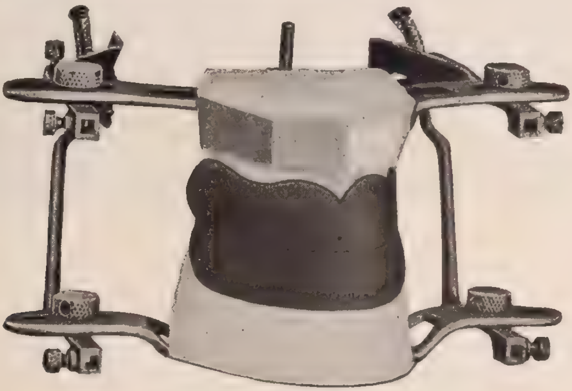

Fig. 7.

placing the pin in the rear to hold the bite at the established distance, and remove the forward sections as shown in Fig. 7.

The three essential requirements for anatomical articulation, i.e., properly placed models, correctly adjusted condyle paths and exactly located rotation points, have been met, and the instrument is now ready to serve as an anatomical articulator. The illustrations in Fig. 8 are intended to point out the inaccuracies of the ordinary face-bow. The solid lines indicate the planes on which the teeth should articulate; the dotted lines indicate the incorrect location, caused by error in the adjustment of the face-bow, especially in the placing of the contact points. Its mesio-distal inclination should be as nearly parallel with a line from the lower margin of the auditory meatus to the lower margin of the ala of the nose, as the case will admit. It will be observed from Fig. 7 that the remaining parts of the face-bow will serve as an exacting guide to determine these inclinations.

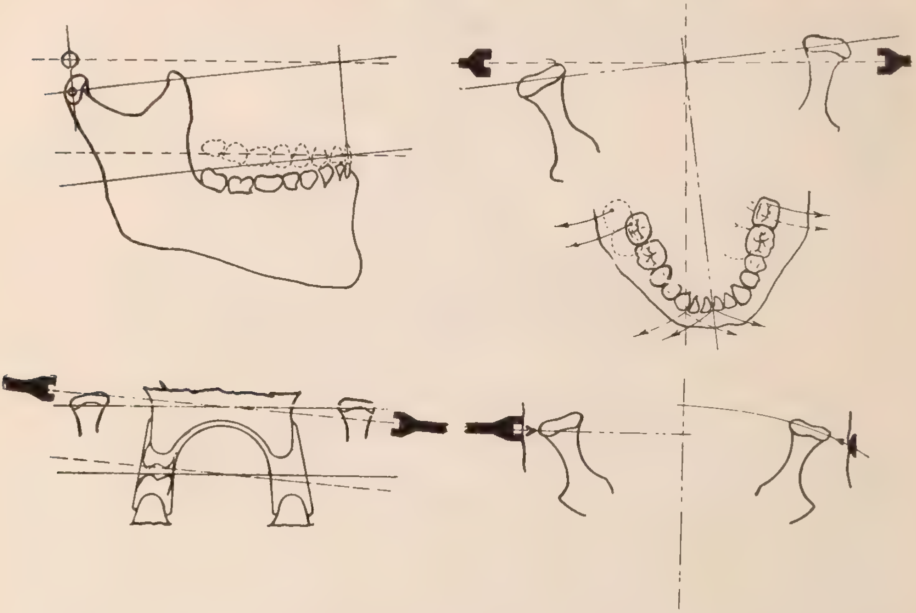

Fig. 8.

VEGETABLE LORE

Be like the cabbage—get a head—
  Though on small celery;
Just manifest an onion's strength
  And climb adversity.

Lettuce all be up and doing;
  Things don't turnip when we wait
If we use a little pepper
  We can beet decree of fate.

Be as patient as a wormwood;
  Try to cast dull caraway;
And some thyme you'll see the radish
  Dawning of a brighter day.

THE VALUE OF ORTHODONTIA TREATMENT TO CERTAIN TYPES OF BACKWARD CHILDREN*

BY GEORGE F. BURKE, D.D.S., DETROIT, MICH.

"IF I WERE ASKED to pick out the deficient, backward children in the school on any single basis, I would do so by collecting the mouth-breathers," said a teacher in one of our public schools recently.

The remark opens up a whole range of possibilities in service to the future generations—a service that all the thinking, progressive world recognizes as incumbent upon it to perform. In this particular regard the service, it seems to me, knocks at the door of the dental profession for its fulfillment and I should say that it is for us to respond not only as a scientific opportunity but as a moral obligation.

Never in the history of the world was the thought and effort of mankind so persistently turned upon the future generations. Eugenics expresses but one phase of this universal fact. If there is race suicide, then there is also what we might call race vision. For some reason or other the world is concerning itself as it never has before with the practical problem of our children's future. If we are willing to admit as never before that we are our brothers' keepers, a thousand times more are we ready to assume, at least in theory, our obligations to the children of the race. All this brings me to the thought that we of the dental profession have a peculiarly definite responsibility if the assertion of the Detroit teacher has in it any measure of truth. But it so happens that not only the dental profession but the medical men agree that there can be no health without a clean,

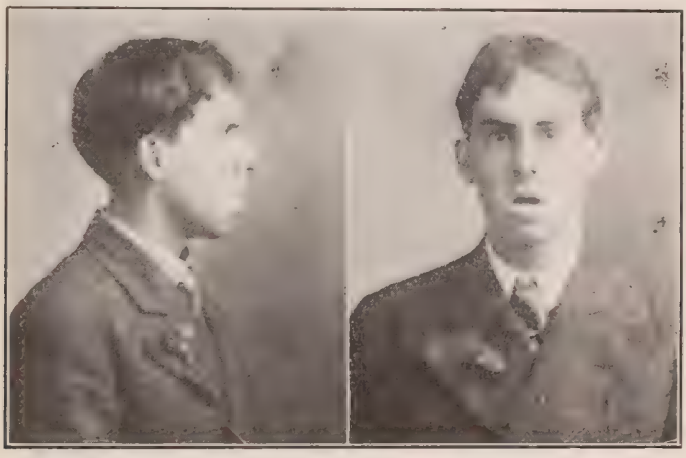

Fig. 1—Represents views of a boy 17 years of age who could not close his mouth, owing to malocclusion of his teeth.

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*Read before the Michigan State Dental Society, 1914.

well-kept mouth, so there remains not the slightest loophole for dodging our share of the burden of the future.

Here in Detroit genuine progress has been made and we are among the few communities to have instituted dental inspection, by well-trained dentists and clinics for the poor children, in the public and parochial schools and hospitals; but this is only touching the surface of a big and grave problem ever so lightly. As one teacher in the poorer districts puts it, the trouble with the dental work in the schools is that there is not enough of it.

Visits to the family dentist or to the free clinic, except to relieve pain, are still regarded by many as superfluous luxuries—innovations which have no necessary part in the scheme of life.

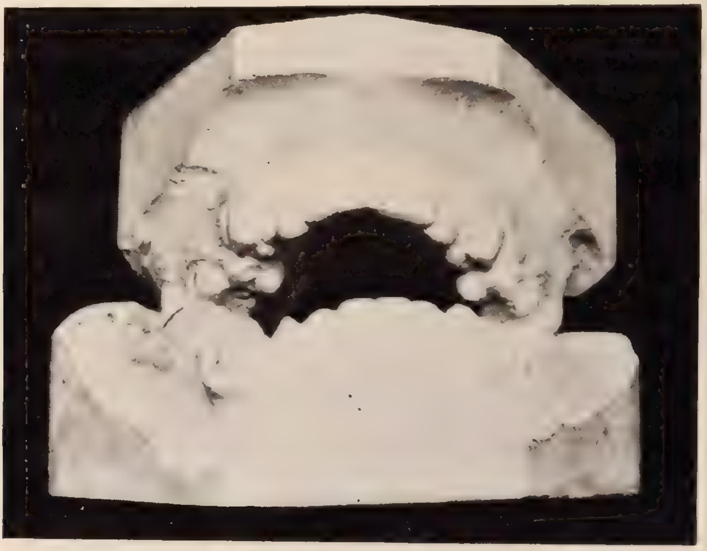

Fig. 2—Shows a view of the models in the case of Fig. 1.

No one who thinks about these matters and has opportunities for observation outside the every-day grind of his regular office practice can fail to be struck by the obvious relationship that exists between dentistry and the newer ideals of social service.

Dentistry has made immense strides in late years and for this very reason it becomes more and more an instrument for good in the hands of those interested in race betterment. This reflection brings me again to a phase of modern dentistry of which the popular mind is unaware, but which has so definite a bearing upon the physical and mental development of the growing child that educators—using that term in its best sense—can no longer afford to ignore it. I refer to Orthodontia, which science during the last decade has been developed to a state of practicability that prepares it for a career of inestimable service to mankind. Only little less of a menace to the growing child than a diseased, germ-laden, unclean mouth is the ill-formed set of teeth in which mal-occlusion works such havoc upon the health of developing children. Many cases of malocclusion of the teeth make adequate mastication of food impossible. There can be only one result—malocclusion means malnutrition and malnutrition means arrested development, a beating down of the physical and mental forces of a child who otherwise might grow splendidly, to a perfect fulfillment of his highest possibilities. I repeat again that this is the age of the future generations.

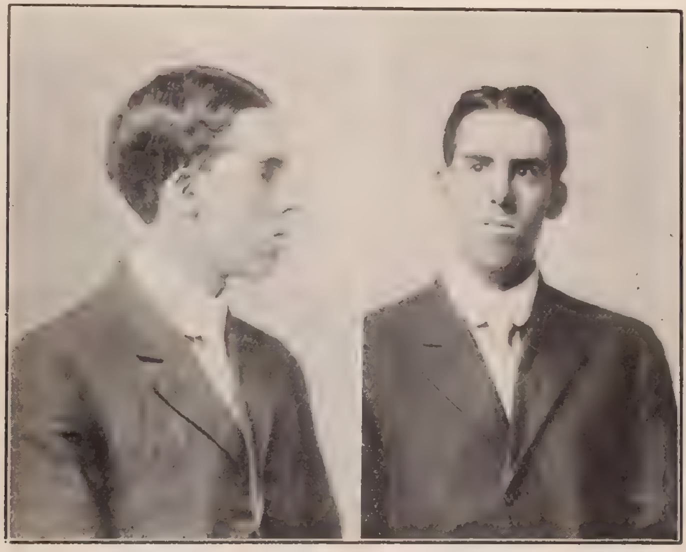

Fig. 3—Shows the same case as Fig. 1, two years after treatment was started. His case was treated by Dr. Martin Dewey, Kansas City, Mo.

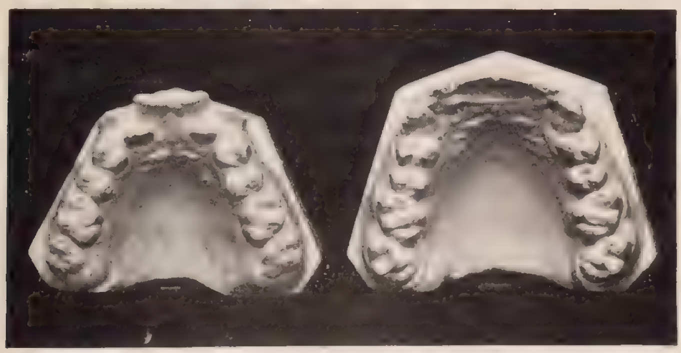

Fig. 4—Represents a case of expansion of the upper arch.

The cry of the noble if illiterate young heroine in that powerful social study, "No. 5 John Street," "Give the young 'uns a chawnct," is being thundered out from the literature and the press of the day. The burden of the cry is upon every one of us who lives in tune with our time and we cannot throw it off.

No one who has looked into conditions with intelligent interest can deny that innumerable children in our schools are suffering from defective teeth, with the resultant susceptibility to disease and general inefficiency. Defective nasal breathing means adenoids or enlarged tonsils, or both. If the active cells which compose these glands in the nasal passages are not supplied with sufficient nourishment they are unable to perform their secretive functions and the cells being inactive, abnormal conditions develop there. Thus malnutrition may be the direct cause of adenoids and the defective breathing caused by adenoids may greatly intensify the symptoms of malnutrition. But the attention of parents and teachers has been so persistently drawn to the pernicious effects of adenoids upon the child that only the hopelessly dull and ignorant are unaware of them.

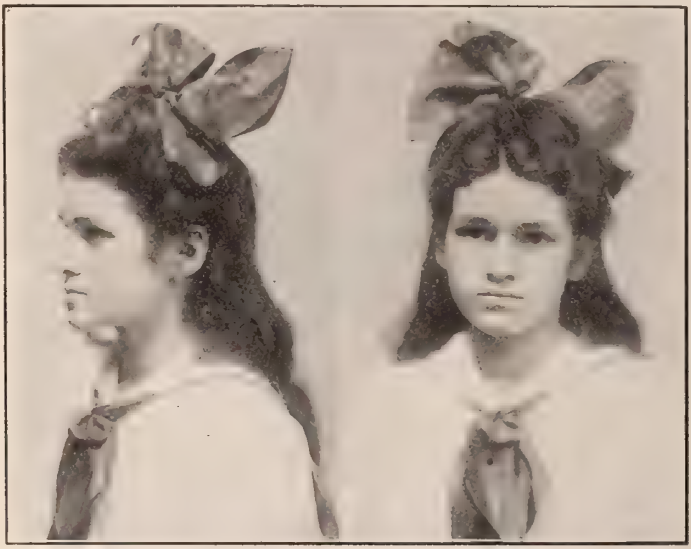

Fig. 5—Represents a case of Class 3 (Angle) where the malocclusion was so marked that thorough mastication of the food was impossible.

But when we come to the subject of malocclusion and its attendant evils, the pioneer work has not yet been done. The whole field lies open before us, at least as far as the question of child welfare is concerned.

Every orthodontist has in his possession models made from the teeth of school children, where malocclusion is painfully in evidence. The contemplation of what such conditions imply in reference to the happiness and usefulness of many human lives is serious and depressing. Some of these models show that thorough mastication of food is out of the question and as a result of this entire mouthfuls are bolted, which gives rise often to overeating, indigestion, constipation or anemia, all creating a condition in which bodily resistance is lowered, which ultimately means disease.

Just as the subject of mouth-breathing is intimately connected with malocclusion so is the much discussed but little understood question of diet largely responsible for the malformed jaws, the narrow arches, that are symptoms of an artificial, over-civilized mode of life. Malocclusion of the teeth results in most instances from a dietary such as the following: *Breakfast*—Bread and milk or porridge, milk, coffee or cocoa, eggs and bread and butter; *Dinner*—Potatoes and gravy or meat, milk, pudding, tea, milk or toast with bread and butter, jam or cakes. Food of this kind does not invite mastication and so we have inactivity of the masticatory apparatus resulting in faulty development of the arches.

An examination of the skulls of primitive men shows a splendid development of the dental arches and a study of the diet of these people shows that in order to masticate their food it was necessary to submit it to sustained and vigorous chewing. The Tasmanians include among their articles of diet a species of seaweed. The Indians of North California chewed pelp. Bushmen, when short of food, chewed gun-skin until their jaws ached. The Modoc Indians chewed raw kais root. The Esquimaux include in their diet the raw skin of the whale, the porpoise and the seal for the blubber it contains. The lower Californian chewed deer skin and ox skin. The habit of chewing sugar cane is common today in all countries where cane is grown. The vigorous exercise required in masticating such diets resulted in a fine development of the dental arches and adjacent parts. Modern methods of preparing food for the table provide that they shall be soft and if the family cook were to provide coarser and harder food, which would be far better, especially for the children, her position would be in peril. Sensible mothers are they who provide crusts of bread for their children to insure a better development of the dental arches and less malocclusion.

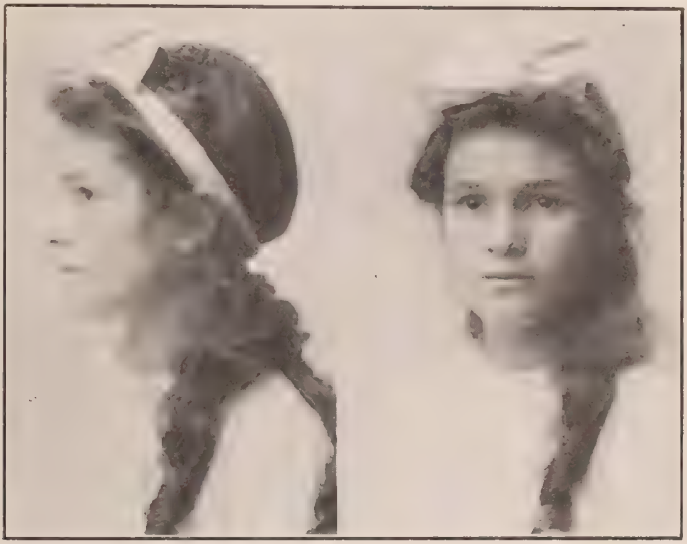

Fig. 6—Represents the same case as is shown in Fig. 5 less than a year after treatment was started by the writer.

Aside from the effect upon the bodily health the question of the effect of malocclusion upon the comeliness of the child is one which cannot be lightly passed by. A receding chin or a protruding mandible, together with a lack of development of the maxilla, frequently gives rise to a form of mental depression owing to the consciousness of a malformed countenance. It would require a woeful lack of imagination and sympathy to regard these conditions with apathy—not to see the injustice of letting helpless children grow to a hampered manhood and womanhood, crippled physically and mentally, their pride hurt with a depressing consciousness of disfigurement.

Every layman, who has given the least thought to his physical well being, knows that without mastication there can be no health. Mastication by breaking the food up into small particles enables it to be brought into contact with the digestive juices.

Mastication promotes the flow of saliva and the insalivation of food. Mastication increases the amount of alkaline saliva passing into the stomach; mastication stimulates the heart and promotes general circulation, but mastication and malocclusion are incompatible.

We have established the right of the child to the benefits of mouth hygiene and much work remains for us to do in this regard, but in the meantime it is my plea that we ask still more for him—that we urge his right to the scientific aid which alone can restore to him a normal dental structure of which an improper diet and other conditions, over which he has no control, have robbed him. I should say that Boards of Health and private benevolence should join hands in providing the children of the poor with skilled orthodontic care. Here is an opportunity for the philanthropist, and already some altruistically-inclined men in this community have lent aid to some bright little children, who, but for this service, must have struggled in vain against the manifold handicaps of unsightly and enervating malformation.

THE MOUTH AS A CATCH-BASIN

That the mouth is a catch-basin for disease germs and a great source of disease, especially among children, has been determined by experiments just concluded by Western Reserve Dental School students at Cleveland.

A report submitted by Dr. C. L. McDonald, who did the bacteriological work, showed that Dora Milsberg, student who started out with a party of six students with as nearly sterile mouths as possible, within one hour after riding in street cars and walking on down-town streets in Cleveland, had 180 bacteria per cubic centimeter in her mouth, with varieties of germs which produce destruction of teeth, abscesses, tonsilitis, catarrh and pneumonia. Doctor McDonald declares conditions would be five to six times worse in mouths with bad teeth.

ORAL PROPHYLAXIS*

BY GRACE ROGERS SPALDING, D.D.S., DETROIT, MICH.

IN ADDRESSING YOU TONIGHT on the elusive subject of oral prophylaxis, it is with a desire to turn your attention from the operative technic of the work, to a study of other phases equally important to the successful practice of this comparatively new branch of dentistry.

It is a customary and much criticised habit of dentists to exaggerate the technical principles involved in any line of work, many times totally obscuring other aspects of vast importance. While a criticism of this narrow viewpoint is just, yet it must be remembered that our profession is young and is only beginning to come into its own.

We have been too engrossed in the difficulties involved in restoring lost teeth or lost parts of teeth to have had much time to study the causes producing the need for operative dentistry. However, as we became more successful in these restorations, and better satisfied with our efforts, we took the time to look up from our work long enough to rest and to get a different perspective. Then, when we again looked into the mouths of our patients, we had a new vision. We saw not only the teeth themselves, but their environment, which was one of neglect and uncleanliness, endangering not only the supporting tissues of the teeth we had so carefully cherished, but the health of our patients as well. This realization was a great shock to many of us for we had conscientiously believed we were rendering our best services. Let us realize, too, that until recently but few people, including dentists themselves, have appreciated how great was the skill required of the dentist in the work of tooth restoration. He has been concentrating his efforts, trying faithfully to meet these requirements, and, until of late (the progress of dentistry making it practical to have some work done by skilled laboratory technicians), this effort has occupied all of the time devoted to the practice of his profession. This resulted in overlooking conditions sadly needing his attention and services.

To meet with success in the operative technic of oral prophylaxis, it is essential that the operator have definite and accurate knowledge of the needs in each case, knowledge best gained through carefully directed experience in the work.

Thoroughness and attention to detail are of prime importance, for upon these two foundation stones is laid the success of preventive dentistry.

If a dentist understands first of all just what is needed and then, with accuracy and absolute thoroughness, does this and no more, he will surely succeed from a *technical* standpoint. If the dental nurse can do this work for him, all well and good, but is this *all* of oral prophylaxis? Not any more than the investment of an impression, the making of a model, carving of the wax, and casting of the inlay, is all there is to the restoration of the crown of a tooth partially destroyed by decay. It is an important part, I grant you, but not great enough to overshadow other fundamentals.

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*Read before the Lake Erie Dental Association, 1914.

The average conception of oral prophylaxis is that it is a process of polishing the teeth once each month to prevent some *decay* and the return of diseased conditions once present in the mouths of cases under treatment.

It is no wonder that the dental nurse has been called forth to do this work for us, since this is the grasp the profession at large has of our subject. Let the trained dental nurse polish teeth if you like, providing she is skillful enough to do this without injury to the teeth or their supporting structures, but never say that she is capable of practicing oral prophylaxis. No one but a graduate dentist, with highest of ideals, can carry on this work successfully.

There is a spirit of truth to be realized in this field of dentistry, which will unfortunately be missed by some patients and still more unfortunately by some dentists. Those fortunate ones, dentists and patients, who have become conscious of the true spirit of the work, know that in this branch of dentistry lies the greatest opportunity of our profession.

Most of the misapprehensions that have arisen concerning our subject may be explained by our tendency to see the technical in everything first, and to skim over the surface with little thought or study of a subject brought to our attention. Result in this instance was the conclusion that oral prophylaxis was polishing teeth, by means of which, some decay and pyorrhea were prevented. This sounded easy, so many dentists have tried it without special training and little or no study, in many instances to please their patients who were clamoring for it, or to increase their income.

A case comes to mind of a dentist who for eight years held out against the insistent demands of his patients for oral prophylaxis; then when he saw his practice dwindling, partially because his patients realized the need for this kind of service, he gave in to the extent of giving "treatments" every three months, as treatments given more often, "will wear the enamel," he says. This statement alone, very plainly shows that he has not even grasped the first *technical* principle, and yet is attempting to give "treatments." This case has been mentioned only because it is representative of such a large percentage of dentists who are attempting to give treatments which they call oral prophylaxis, but which in reality are only improvements on former so-called "tooth cleaning" methods and of no more value to the patient. The mistake lies, not in the attempt to do, but in the attitude of doing. To assume that one knows all there is to know in dentistry, is a decided error and one only deceives himself.

Anyone who has ever had true oral prophylaxis and is capable of appreciating it, will never be satisfied with anything less efficient or comprehensive.

It is the unwillingness of many dentists to admit their inability to cope with diseased conditions in tooth environment, that has been responsible for retarding a most necessary and important branch of dentistry.

To attempt the work because patients demand it, or because others are doing it, results in a wrong attitude, a depreciation of the value of the work which is absorbed by the patient, and again is our worthy cause retarded. Dr. Thos. B. Hartzell recently remarked, that if only dentists would get away from the one-tooth idea, they would be able to render humanity a much greater service. How true this is!

In order, also, for us to render a better, more useful and intelligent service in oral prophylaxis, we must get away from the one idea that it is just polishing teeth. Each patient consulting his dentist for this preventive treatment should have many things explained to him, even before the first appointment is given.

He must be shown abnormal, diseased and unclean conditions, and have the causes of these explained. He must be asked to give his word of honor that he will obey instructions to the letter, else satisfactory results cannot be accomplished. It is absolutely essential that the patients' co-operation be had from the beginning, otherwise the dentist will always be handicapped and the results of the work at best only temporary.

If one waits until the work is started and then tries to get the cooperation he needs, it will be only by constant effort on his part that he will be able to obtain it. It is just as necessary for a patient to carry out instructions specifically, as it is that he should render just compensation for these services. It is the vivid first impression that is most lasting, and if he understands at his first visit that we *demand* co-operation, that otherwise we cannot undertake to treat his case, he will seldom, if ever, need to be reminded of his promise.

One of the principal phases of oral prophylaxis is the *instruction of patients,* upon which subject a volume might be written. The almost universal cry of patients is, "Why haven't I been told this before?" The care of the mouth is not an easy task and the care of some mouths is most difficult, and our best knowledge must be applied in discovering effectual methods whereby patients can care for their mouths. Each patient needs definite, accurate, and specific instructions for his individual case. For example, it is not enough to say, "You should use dental floss every day," as this is very indefinite and inadequate instruction, and it is only by going into detail that we can convey to a mind not accustomed to thinking along dental lines the ideas we have acquired by perhaps years of study.

We must appeal to reason, and not say, do thus and so, without explaining why. I do not know of anything I would spend valuable time in doing, just because someone said I should, unless I knew why I was doing it, and what it might accomplish. A new patient said recently in reply to my inquiry about his using dental floss, "No, my wife uses it, but I never could see any sense in it. I don't seem to be able to get anything out from between my teeth with it." He was very much surprised when I explained to him the reasons for using dental floss other than the removal of food particles, and showed him the large number of proximal fillings in his teeth, and the area of exposed tooth surface not reached by the tooth brush, and dependent upon the dental floss for cleanliness and freedom from bacterial plaques. He has been absolutely faithful in his use of dental floss ever since, and this was six months ago.

It is also not enough to explain why—they must also be shown how, not told, but the method of using their tools must be actually demonstrated. Patients are not born with a knowledge of how to care for their teeth, and unless some dentist has taught them intelligently and carefully, they do not know how. Instructions need to be repeated to some patients many times, for usually if they do not get the results you expect of them, it is because they do not understand your instructions, rather than that they do not try to obey them. At any rate it is diplomatic and safe to go upon this assumption in every case.

Before true oral prophylaxis treatments can be started, the curative treatment must have been carried out. The mouth should have been restored to a state of health, comfort and usefulness in so far as our present knowledge and technic will enable us to accomplish. The result naturally would depend upon the ability, knowledge and ideals of the operator, as well as his appreciation of detail work. I know of no other work in dentistry which is made up so largely of detail work or the success of which is so dependent upon attention to the little things.

Let us assume that all tooth surfaces have been placed in as highly a polished state as is practical for that mouth; that any operative work which is a menace to that mouth has been replaced by accurate restoration; that there are no suppurating pockets present; that occlusal and contact restorations have been made where practical: then we are ready to consider the work that may be carried on for this patient.

To derive all the results obtainable from true oral prophylaxis, as introduced and proven by Dr. D. D. Smith, it is necessary that the patient should receive treatments systematically once each month. Allowing for vacations, illness and human nature, this averages from eight to ten treatments each year. If for financial reasons or distance from dentist this is not possible, then there is but one thing to do, and that, the best you can do under the circumstances, only the patient must understand that this is not ideal. Have him come as often as he can and impress him with the importance of this preventive work.

Generally speaking, the regular prophylaxis treatment of the mouth (after the necessary curative treatment has been given) includes the radical change of tooth environment by mechanical and chemical means. All irritants of whatever nature are removed from under the free margin of the gum, as well as from all exposed tooth surfaces. The dentist must be able to recognize the slightest deviation from normal of the color and form of the soft tissues immediately surrounding the teeth, and he must watch the delicate gum festoons with the greatest care. He must be able to interpret these indications of local disturbance at once and give them the necessary attention, in this way preventing irritation or destruction of tissue and more radical methods of treatment.

The oral prophylaxis treatment consists further in kindly helpful criticism of the patient (or praise, as the occasion demands), with regard to the care of his mouth. Also, the correct diagnosis of uncomfortable conditions in the teeth, the treatment of any sensitive areas, the recognition of decay in its incipiency and its checking or retarding on easily accessible areas, the medication of gum tissue lacking tone, and the massage of the supporting structures of the teeth.

This, in a general way, covers the *local* treatment of mouth conditions from an oral prophylaxis standpoint. It is the greatest opportunity in dentistry to be able to prevent in so large a measure the need for tooth restorations and curative treatments, by the dentist; to be able to preserve the teeth in a clean, healthful environment in a comfortable, useful condition; to prevent suffering in the mouth; to promote the general health by conserving an efficient masticatory apparatus; to prevent the systemic disorders resulting from the absorption of infection from the mouth; to increase the demand for and appreciation of better dentistry; to educate patients so that they can recognize and value better dental services; and to assist in the elevation of a worthy profession to a higher plane.

However, this does not embrace all of our opportunities in this field of dentistry, and a most important one is still to be considered, that of making the effort to lessen the great demand for our services which appears now about to overwhelm us. This is opening a large subject, and I can but touch upon it and suggest that you think it over.

Physicians and dentists are spending their lives in attempting to repair the destruction wrought by a lack of balance and poise in the life of the individual, and his imperfect adjustment to the environment in which he lives. In short, we are treating the results of abnormal living, and we are not making sufficient effort to create within the minds of our patients a desire for a more nearly normal, sane and better balanced life, by means of which so much disease could be prevented, and the need for our services from a reconstructive standpoint, materially lessened.

Our experience has shown us that people do not innately know how to care for their mouths. The mouth is but a small part of the body and inquiry has proven that people do not know how to care for the rest of their physical beings any more intelligently, unless some one has taught them, individually. Physicians have assumed that their patients knew how to care for their bodies, or have been too much engrossed in treating the results of lack of care, to have been able to give them this much needed instruction.

Most cultured people have hazy, indefinite, general ideas about personal hygiene, but really helpful, specific information is missing to such an extent that I believe it safe to state that not more than one in ten of the patients we see knows how to care for his body.

No one who is physically handicapped, can be wholly efficient. Health is a prime factor in determining our usefulness in this world. Then is it not incumbent upon us to teach the art of living in so far as it is practicable to those of our patients who are largely of the class of people that suffer most, physically, from our advanced civilization, and whose usefulness and influence in the world at large is probably of greatest value?

The recent much quoted remark of Doctor Mayo, that "the next step in preventive medicine must come from the dental profession," creates in the field of oral prophylaxis a hearty response. We see patients at regular intervals, in apparently good health, most of them carrying on their daily occupations, while the physician usually sees them when actually ill. We see them under circumstances which reveal to us, if on the alert, symptoms of abnormal bodily conditions, such as extreme nervousness, indigestion, anemia, etc. Shall we ignore these symptoms and continue trying to obtain response to our treatments, handicapped by the lowered tone and resistance of the entire body, of which we are treating a part? In order to accomplish the most in our field of endeavor we must interest ourselves in preventive medicine.

As was before stated, patients require accurate, definite, specific instructions, suited to their individual needs. It may be that some need enlightenment in the line of physiology, or emphasis laid upon certain simple rules of general hygiene. Others may require mental suggestion or a bit of philosophy. Still others may need definite instructions in Fletcherism, or deep breathing. Last, but not least, there are a number who need plain common-sense advice, administered in no uncertain doses. It is astonishing how many serious systemic disturbances can be relieved by a change of habits of thought and living.

A worthy cause has recently been instigated and established—that of scientific research work in dentistry. Valuable information has already been obtained concerning the intricate causes of diseased conditions resulting from our mode of living. We should assist this work in so far as we are financially able, but most of us have not the adaptability, time, or the training to fit us for scientific research. We, however, all have the opportunity to render an even greater service to humanity by lessening the need for scientific research work in the field of medicine and dentistry.

It is the duty of every dentist to so thoroughly inform himself in general hygiene, physiological and psychological principles, Fletcherism, physical culture, and many other equally helpful and practical subjects, so that he may be able to render a more permanent and lasting service to patients than he can by limiting his attentions exclusively to the mouth.

We all need to pay more attention to the study of the art of living, to apply daily in our own lives the principles we teach; then we can demand co-operation in this direction from our patients. If we prevent the lowering of resistance to disease in the body, do we not maintain the natural resistance of tissues in the mouth?

We may consider the mouth a barometer indicating many physical disturbances, which we can often correct by intelligent advice. Let us not accept the conclusion that the cause of erosion is so obscure that only years of patient research will result in an explanation of it or that it must be reached through chemical agents. On the contrary, let us carefully observe the typical erosion case to see if there is not some very evident diseased condition of the nervous system or a disturbed mental state, such as a rebellious attitude toward life, a hypersensitive nature, or the patient inclined to be over-exact or precise in everything he does, thereby inhibiting a normal functioning of the secretory glands and cells of the mouth.

Let us consider the general health of our patients of prime importance to us, and instead of recommending vinegar, or orange juice, to artificially stimulate the flow of alkaline saliva, let us teach our patients to so control their daily living, that the secretion of alkaline saliva will not be inhibited, but *naturally* stimulated.

DISCUSSION.

DR. PAULINE L. HORVITZ, Pittsburg, Pa.: After listening to Dr. Spalding's paper, it seems to me that one is immediately impressed with her very earnest and sincere appeal for only the loftiest ideals in the practice of dentistry.

In speaking of Oral Prophylaxis as being "a comparatively new branch of dentistry," I feel that I must take issue with the essayist. In many of the contributions to literature of various kinds, even the ancient writers have mentioned the necessity of the cleaning of the teeth as an aid to physical beauty as well as a prophylactic measure.

Dr. Burton Lee Thorpe in an address on Prophylaxis before the National Dental Association last year, stated that, "The ancient Egyptians, Greeks, Romans, Chinese and leaders in Israel not only preached but practiced mouth hygiene."

The advantages of mouth hygiene have always been well understood but have received insufficient attention. A noted physician recently stated that tuberculosis is probably the most discussed problem in medical science today. And knowing that the tubercle bacilli and other micro-organisms enter the body through the mouth, is it not all the more important that Oral Prophylaxis be the most discussed subject today?

As early as 1817 it had been proven beyond a shadow of a doubt that many varieties of bacteria causing the various diseases to which the human body is subject, have their origin in the mouth.

The medical profession, which until only recently was somewhat skeptical about the very important role oral sepsis plays in the cause of disease, admitted at first with considerable reluctance, and now most emphatically, that it is impossible to make a correct diagnosis unless they take into consideration the condition of the teeth and adjacent tissues.

Also, that the first essential in the intelligent treatment of disease is to secure as far as possible a hygienic condition of the mouth.

It has been said that only the mouth of the infant and the edentulous mouth of the adult are free from bacteria.

In this view I cannot concur, as it is an established fact that micro-organisms enter the mouth and by attaching themselves to the soft tissues of the mouth, form a plaque.

And since this is true, what wonderful opportunities for the numerous varieties of bacteria to accommodate themselves on the approximal surfaces, and in pits and fissures of the teeth; start fermentation and form plaques: the results of which you are fully aware of.

The essayist says in part, "We have been too engrossed in the difficulties involved in restoring lost teeth or lost parts of teeth to have had much time to study the causes producing the need for operative dentistry." Quite true, and although we have made splendid progress in prosthetic dentistry, nevertheless the most serious question which we as dentists face today is that of disease, its recognition and treatment, or better still, how to prevent it.

From a bacteriological point of view, there is no such thing as a clean tooth. It is possible, however, for many varieties of micro-organisms found in the mouth to lie dormant for a length of time, and then later on with a change of environment and a lowered vitality, these same micro-organisms will cause caries of the teeth. And even if one's teeth are immune from decay, the continual swallowing of food debris and soft deposits from around the necks of teeth, together with pus discharging from abscessed teeth and old roots, is bound to produce a most serious condition of the system.

A patient recently inquired when to start prophylaxis. Some writers suggest childhood. I believe at birth.

A most deplorable condition in my experience with patients is that the majority are extremely ignorant in knowing how to handle the tooth brush and dental floss. Here the dentist must assume the position of teacher, as he is the only one who can give this information intelligently.

Realizing conditions as they exist, it behooves us to take our place among the professions with the surgeon, internist, oculist, laryngologist and orthopedist, as we all have a common interest in this problem of preventive dentistry.

Dr. S. M. Stauffer, Pittsburg: Before I begin, a word of explanation may be in order. I took the broad meaning from the subject and prepared my remarks according to my first impression of Dr. D. D. Smith's idea of oral prophylaxis, and as it is only one step further to pyorrhea, my remarks, I trust, will not be out of order.

Doctor Spalding has digressed somewhat from the customary method of presenting this subject. I had hoped the doctor would do so very much more radically, and thus save me the task of trying to present to you a more efficient remedy for preventing and combating this mysterious condition. Doctor Spalding has referred to the operative technic, placing her emphasis on teaching, instructing and securing the co-operation of her patients.

This is all very good indeed, but in order to combat such a lowered state of vitality that will produce any abnormal condition of the mouth, or pyorrhea, we must first learn what the cause of this mysterious condition is before we can do so successfully. Dr. M. H. Fletcher said that tartar was the cause of pyorrhea. I asked him what was the *cause* of the *cause*, and his reply to this was that it occurred in normal mouths. This I am not inclined to accept, be it salivary or serumal calculus.

Doctor Spalding says that a neglected and unsanitary mouth endangers not only the supporting tissues of the teeth, but the health of the patient as well. I want to go on record as saying that exactly the reverse is the truth as I see it. That is, that it is the lowered state of vitality that is responsible for the tartar being present and the secretions abnormal, all of this being produced by insufficient mastication and insalivation of the foods we indulge in. Then when we do not know how to select and combine our food any better than we do, what can we expect but disastrous results? With a wrong selection of food improperly cooked and improperly combined, then insufficiently masticated and insalivated, indigestion, malassimilation, faulty elimination and auto-toxemia are certain and mankind can and does suffer, in consequence, untold agonies of every description that flesh is heir to. Pyorrhea and its kindred are among these deplorable and mysterious conditions.

Let us take for example an abscess in the mastoid process. What is the cause of it? A little tartar or a gelatinous plaque, formed on the malleus, or food of some sort, that has not been removed from the strapes? By no means, for how could anything get into this hermetically sealed cavity? This condition is produced by a lowered state of vitality, lowering the vital resistance, and is the result of incorrect habits of life, be they physiological, psychological or spiritual, which in turn produces faulty metabolism. And faulty metabolism is the cause of any disorder or disease, be it rheumatism, gall stones, cancer, appendicitis, baldness, uremic poisoning, pyorrhea, and every other malady that *afflicts mankind* (or rather with which mankind afflicts himself). This may be a new thought to some of you, but such is actually the case.

The best oral prophylaxis specialist we can employ is "Doctor Nature," with her food taken in as near a natural state as possible. This natural food would give the gums and teeth sufficient friction and exercise to cleanse them, thus causing the blood to permeate the capillaries and thoroughly nourish all of these organs, thereby preventing this mysterious condition.

In carrying out this regime of thorough mastication and insalivation of natural foods, dyspepsia with its train of evil results—malassimilation, faulty elimination and a toxic condition of the system, or self-poisoning—would gradually and certainly disappear.

We cannot jump into this condition abruptly; we must evolve into it. We must first learn ourselves, then teach our patients how to gradually but surely evolve into a condition that will make the oral prophylaxis specialist a rarity.

But a thorough knowledge and understanding of the cause and its prevention, also the treatment and cure, must be comprehended by the dentist before such results can be obtained.

I want to present (with as much emphasis as I can well command) that these results *can* be *obtained*, but we will be obliged to go after them more vigorously than the average M. D. does in his attempt to cure disease. The dentist, like the M. D., in too many cases is treating symptoms, or results, and not getting at the cause and removing it as he should.

I referred to the psychological factor above. It must be given due consideration, for a perverted psychological condition will produce faulty metabolism.

The psychological influence has been found to be of extreme importance, which is illustrated by the fact that if sad news is received or anger occurs when a mother is nursing her babe, it will become sick. Many people on receiving sad news lose their appetite and cannot eat. Many abnormalities in the physical condition are indirectly, and often directly, the result of a "mental twist," as it were, an abnormal point of view, an "obsession," and when this "mental twist," "obsession" or what not, is straightened out or removed, physical well-being is again re-established.

A chain is no stronger than its weakest link. It is only too true the teeth and alveolar structures are the weakest link and suffer early destruction in many an individual who apparently is enjoying good health otherwise, because the secretions of the mouth are abnormal, the result of faulty metabolism, produced by incorrect habits of life.

Doctor Spalding says that a universal cry of patients is, "Why haven't I been told this before?"

It is only too true that patients should be thoroughly instructed how to use their tooth brushes, floss silk, select and combine their food, etc., but if mankind will *stop, look* and *listen* to the danger signals *Nature* is *floating* and then *heed them*, he will learn her simple and efficient methods for the *prevention* and *cure* of pyorrhea, with the blessings that accompany this rare condition, for freedom from pyorrhea is a rare condition after the ages of forty-five or fifty.

When we learn from sad experience that we have had enough of this deplorable condition and finally have our eyes opened to the possibilities that Nature has in store for us, *then only*, and justly so, will we raise the cry, "Why haven't we been told this before?"

Then, to those suffering from pyorrhea, with the aid of a thoroughly competent dentist, it will be a comparatively easy task to materially improve it, or at least prevent it from making the destruction that it has heretofore made.

Yes, patients need kindly, helpful criticisms, or praise, as the case demands.

In the last four pages of Doctor Spalding's paper, which I just read this afternoon, I am pleased to say she has digressed more than in the former pages, and recommends a better balanced and more hygienic life for combating this condition.

Doctor Spalding says she doubts if more than one in ten knows how to take care of his body. I will make it stronger, hardly one in a hundred has this knowledge. Why? Simply because so few medical schools are teaching dietetics. Only six out of twenty-two in the United States. One school is devoting twenty-six hours; three, sixteen hours, and two, eleven hours, in a four-years' course, to this most important subject. Charles Flammer has made the assertion that in ten years the medical schools will devote ten times more time than at present to dietetics; and in twenty years dietetics will be the major subject taught in the then medical colleges.

Yes; preventive medicine is what we need, and badly. "The *ounce* of *prevention*" is better than the "pound of cure."

Again I endorse Doctor Spalding's statement that patients require accurate, definite and specific instructions, suited to their individual needs, it may be in some phase of "hygiene," "philosophy" or "common sense" intelligently administered.

Doctor Spalding has not given any dietetic instructions to help combat this condition, I am sorry to say. Therefore I have not considered it. However, it should be considered; in fact, in my opinion, it should have received the greatest part of the evening for its consideration and discussion.

We have not given due consideration to the condition of the mouth as a whole. The mouth should be considered, not only as the space occupied by the teeth, in reality it should be considered as being thirty-two feet long. Then, in order to have a thoroughly clean mouth, the whole of the alimentary tract must be taken into consideration, and kept clean, for you cannot clean only one end of a tube and expect to have the whole tube clean.

What is the cause of oral sepsis? Oral sepsis is not the result of purely local conditions, but depends very largely, if not altogether, upon the condition of the entire alimentary tract. In fact, septic conditions of the alimentary canal undoubtedly are the primary and principal causes.

How shall we correct these conditions? By limiting our treatment to the oral cavity? I say most emphatically, "No!" But by going farther into this vast subject, and by preventing the fermentation and decomposition of foods in the entire alimentary canal.

How shall we do it? That is the problem this body should study.

My opinion, however, is, if this body wants to learn something about oral sepsis, it must go into the subject much farther than it has done heretofore and learn the cause.

These dangerous cess pools in the alimentary canal, as well as in the oral cavity, must be cleaned out before we can get any special results. If you will go into the real causes of these conditions and correct them, you will never have any cess-pools to clean out.

I want to impress this upon your minds—that there will be no cess-pools, or pyorrhea pockets, for if we keep the alimentary tract clean throughout the stomach and bowels by preventing fermentation and decomposition, such are impossible.

A deeper and more comprehensive study of this subject is what I would like to see this society take up and investigate until it has fathomed the depths of the at present mysterious condition.

TECHNIC FOR GOLD INLAYS AND CROWNS BY THE INDIRECT METHOD APPLIED TO BRIDGE WORK*

BY E. A. R. TORSCH, D.D.S., LOUISVILLE, KY.

WE WILL FIRST CONSIDER the gold inlay. I take for granted that every man knows how to prepare the cavity for inlays, but this must be said: if you have trouble preparing cavities for the direct method of inlay work you will experience more difficulty preparing them for the indirect work, because the defects of cavity preparation are more noticeable in the latter, therefore the very best preparation must be followed, taking care to have the embrasures well extended and all bell-shaped crowns parallel, buccally and lingually.

When cavity is properly prepared we next desire an accurate impression, for the indirect method may be said to consist chiefly of impressions and metal models.

An impression tray is made of German silver or copper, cut to go from occlusal surface down to gingival with a flange going over buccal and lingual margins. I follow Dr. Van Wert's patterns pretty closely, having the tray of proper size and shape, place soft modeling compound into it and force into place, chill and remove. The first impression will not be accurate because the whole mass of modeling compound is soft and does not adapt itself well to all surfaces of the cavity. Dry this impression and heat more compound and again force into place, chill and remove; again repeat this procedure until you obtain an accurate impression or one which shows plainly all the lines of the cavity. Embed the tray and compound impression into soft plaster so as to form a matrix of plaster, being sure to have all the lines of the cavity exposed. When plaster is set, pack with amalgam, first rather soft consistency, finishing with a stiff mix.

When amalgam is thoroughly set, break away plaster and remove the amalgam model in which the wax model is to be made. Instead of putting wax into the alloy model I swedge 36 gauge, 24k gold into the cavity and trim it to proper margins and pack my wax into that, which gives me a pattern which I can remove and try into patient's mouth without fear of distorting margins. It gives a definite, hard substance to cast to instead of casting into a variable investment material. It avoids nodules of gold on inner surfaces of inlay; it takes care of contraction and expansion of molten gold, thereby assuring good margins; it gives pure gold margins for burnishing, no matter what karat of gold is used for inlay, and it is, to my mind, the only way in which M. O. D. inlays can be successfully cast so the gold will go to the extreme mesio and disto gingival margins. With the gold swedged, the wax is packed and cast is made in usual manner.

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*Given as a Clinic, Indiana State Dental Society, 1914.

THE RICHMOND CROWN WITH REMOVABLE PORCELAIN FACING

Prepare root end to your own taste as you think it best. Make a band of German silver which fits loosely the root end, allowing some modeling compound to encircle the root. Cut pins to proper size and fit them in canals. Take impression of root end, by forcing band filled with soft modeling compound under the free margin of gum, disregarding pins in first impression, chill and remove, place pins in position in root and add more soft compound to impression, force into place again, chill and remove, repeat if necessary until an accurate impression is obtained. Instead of embedding this impression in soft plaster as in case of inlay, my practice is to rap a small, stiff strip of paper around the band, allowing it to extend beyond the pins, wax the pins with some separating material so they may easily be removed from the amalgam model, then pack as in case of inlay. When set remove from paper matrix and remove pins, swedge 36 gauge, 24k. gold over the alloy model, trim it until a very narrow coping which will cause the patient no pain when placed on root end, as would the fitting of bands for Richmond crowns. This coping differs from others also in that it fits, not only at the periphery of the band portion, but the entire coping fits the root end like an inlay or filling and would thereby lessen greatly the liability to decay of the root. With coping swedged, put pins through it on alloy model and attach with sticky wax, and solder with minute quantity of solder the pins to coping. Then select the tooth to be used. I use the Goslee tooth very extensively. Swedge backing to Goslee tooth, having selected one which will leave a little space between tooth and coping for gold in casting or solder to attach pin in Goslee's tooth to the coping. Wax Goslee tooth, its pin and coping and its pin or pins together in proper alignment in the mouth, transfer to alloy model and complete waxing with aid of hot burnisher. Cast in usual manner and the result will be pleasing, for the cast of gold will make a fine margin against the lines of the coping. This crown may also be soldered when coping and tooth backing have been waxed into place.

GOLD CAST CROWNS

Take accurate impression of tooth to be crowned, pack impression with amalgam, allow to set and swedge pure gold, 36 gauge, over alloy model, wax, carve and cast.

INDIRECT METHOD IN BRIDGE WORK

Do not throw away your alloy models for inlays or crowns; if you expect to construct a bridge, they are valuable.

For instance, if a bridge is made from cuspid to second molar, you have an alloy model upon which a Richmond crown, above described, was constructed. If you have also the alloy model of the second molar, upon which the cast gold crown was constructed, keep them.

Take a bite for bridge in usual way, take an impression in which both crowns will be found; now place alloy models of each crown into the crowns in the impression, pour the impression in plaster, separate and you have the abutment piece on metal models which enables you to remove them at will. You may shape up your dummies, wax them to abutment pieces and remove from model on articulator, invest and solder, always preserving the articulating model and bite and try out the finished bridge as to contraction during soldering process.

This method may be employed with equal success whether you make a cast gold shell crown or not; if ordinary crown is made; take an impression of tooth and pour that impression in plaster; when set either use the plaster tooth in the crown or take an impression of the plaster reproduction of the tooth in moldine compound and pour Mellot's metal into it, thus obtaining a metal tooth which is used as the alloy tooth described above.

The metal model for bridge construction is one of the most helpful things that has ever come into my hands.

THE GAME

BY BERTON BRALEY

When the game seems lost and you want to quit and you're sticking just by your nerve and grit and you can't see an earthly chance to win and you're weary and jaded and near "all in," don't ever quit as you want to do, but keep your heart till the game is through, till the last hard minute is passed and gone—fight on!

The chaps who win are the boys with pluck who never will quit till the gong is struck, and many and many a game they play is won at the *end* of a *losing* day—won by sticking the struggle out, won by going the whole long route, while they—though weary in brain and brawn—fight on!

So, though you're staggering, weak and blind, battered in body and dazed in mind, you can't be sure that the other side—in spite of its front of strength and pride—may not be tired and jaded, too, and fully as near "all in" as you! You brace and rally—their triumph's gone—fight on!

TECHNIC FOR GOLD INLAY: DIRECT OR INDIRECT METHOD, SWAGED SOFT GOLD, INFUSED 22K GOLD PLATE*

BY DR. HENRY BARNES, CLEVELAND, OHIO

Cavity walls must have sufficient draught to allow the impression to be withdrawn without distortion.

IMPRESSION

Select a suitable sized cold cone of Kerr's impression compound. Heat the apex of cone over flame, holding base with fingers—dip apex into vaseline, then press into cavity—holding thumb and finger of left hand to buccal and lingual so as to form a matrix and confine the impression material within a desired area. Patient may assist by occlusal pressure.

Cool impression while in cavity with jet of cold water; gently withdraw impression from cavity and plunge into ice water—dry and paint surface lightly with 3-in-1 oil. The oil will prevent adhesion of impression material to model.

WORKING MODEL

Wrap impression with a ring of friction tape to form a cup into which Model-Quick may be poured to form working model. Heat Model-Quick and pour (just as it is crystallizing) into impression—hold for a moment until crystallization is complete, then drop into cold water to cool—take out of water, unwrap friction tape, and separate impression and model with fingers.

The models of dual approximal cavities are separated by cutting and breaking to give single working models. Later these may be joined at the cleavage to determine accurate contours.

GOLD MATRIX

A relatively large pellet of soft gold foil is pressed into model cavity with fingers and then formed or shaped with wooden instruments to approximate contours, but these must be *plus contours* to allow for shrinkage in swaging.

SWAGING

Wrap model and gold in cavity within cottonoid sheet or rubber dam or both with rubber over cottonoid. Insert in swager and swage with heavy blows.

The swage is a giant model with improved deep cuts to hold the swage media which is Plastilene, an artist's modeling clay.

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*Clinic at Northern Ohio Dental Society, 1914.

SOLID GOLD MATRIX

Swage and reswage, adding gold where and when needed until desired contour is obtained, which now has become the solid matrix.

Remove swaged gold matrix (i.e., the inlay form) from the model by lifting or teasing with light instruments, or by cutting the model (which does not destroy it).

Carefully hold with pliers over flame and heating to red heat to drive off oil and impurities—cool—replace in cavity model and reswage as before. This ties the several additions sufficiently to permit of rough disking and burring to remove surplus on margins or contours.

Remove from model—place on charcoal block cavo-surface down.

INFUSING 22K. PLATE

A proportionately small piece of 22k. plate is placed on the contour of contact point inlays, on the center of external surface of other inlays and is infused into the solid matrix with a tiny mouth controlled blow-pipe flame. Piece after piece of 22k. plate is in turn infused into the matrix at this same point until all but the margin is saturated with the alloyed gold, leaving the margin of soft pure gold.

Now wrap margin with rope of soft gold, return to model cavity and reswage—remove and again place on charcoal block and sweat soft gold margin to union with inlay.

Return inlay to model and finish approximately, reserving final finish until after cementation within tooth cavity.

DIRECT METHOD

So far this has been the description of the indirect method. If the direct method is desired, instead of returning the inlay to the model cavity after the marginal rope is applied, place it within the tooth cavity and mallet to place and burnish margins—remove and sweat as previously described.

At any stage of this technic the inlay may be transferred to the tooth cavity for determination of contour, margin, sulci and occlusion.

The description of the flame and method of its use will be found in the technic for correction of errors herewith appended.

THE TECHNIC FOR CORRECTION OF ERRORS

The technic is simple and perfect, but it is not self-perfecting. The personal equation enters and hence we may have error at times.

The correction of errors due to faulty technic is as simple as the original technic itself. It is a truism that an imperfect impression nullifies a perfect technic so far as producing an inlay to fit the original cavity is concerned—therefore, a perfect impression is essential.

The most frequent cause of error is the use of too much pressure in the flame, too much flame, or both, an imperfect use of a perfect flame. The flame to be used should be the perfect blue Bunsen and is graduated or proportioned to the size of the inlay and to the extent of surface to be covered, but at no time must a flame which is larger than a pencil point be used for infusion of the 22k. plate. (The largest flame is about the size of a commonwell sharpened lead pencil point, inclusive of the cut wood, and lead, being about three-fourths of an inch. This is graduated down to a flame as small as the exposed lead.) The pencil-point flame is used as a pencil under motion, a touch-and-go action. A comet-tail flame is used only to produce the soft gold surface after polishing and finishing with disks, etc. The pressure to produce pencil-point flame is only a gentle *breathing pressure*, using the cheeks as bellows and the closure of the teeth upon the rubber tube as an instantaneous stop-cock. The comet-tail flame, as the name implies, is a larger flame brushed over the surface and controlled in like manner.

The 22k. plate may have been driven over the external margins, where only pure soft gold is desired, and it may even extend onto cavo surface in which case bur off excess. Then patch with pure soft gold using sufficient to cover defect and extend over external margin, thus restoring the soft gold margin. This patch is matted over the defect and where desired with the fingers, the inlay is grasped with pliers held in one hand and is then inserted in the Bunsen flame. The other hand holds a heavy flattened burnisher which is heated in the same flame and is used while hot to burnish and attach the patch to the external surface. *Great care must be used to prevent overheating at this time.* Return inlay to cavity model and reswage, remove from model and place on charcoal block and *sweat* patch to inlay. A minute film of flux may be used on the external border of the patch only. *Remember* that the greater the density from swaging the less 22k. plate will be required, and the less the tendency to form pits.

If for any reason the inlay should become badly warped or distorted by reason of too much or too strong a flame, discard it and begin anew. If inlay is only slightly warped or is defective on its margins it may be restored by bordering the margin with a matted tape of the pure soft gold, treated as described for the patch. At times it may even be advisable to enclose the entire inlay in a mat of gold and treated in the same manner.

Removing inlay from cavity or cavity model with a sharp pointed instrument inserted into its body forms a pit which will not fill properly unless a small piece of soft gold is packed therein.

The model may be split if desired to return inlay.

It is good practice to swage into the mass of an MO, MOD or O cavity inlay a staple of light platinum wire which may be used to lift it from the cavity.

To make the inlay larger at any point on external surface, place thereon a mat or pellet of pure gold and follow technic as described in patching, after which place thereon a small piece of 22k. plate and infuse.

The impression of the original cavity is so easily obtained except where extraordinary conditions prevail, that two or three may be taken in order to have reserve cavity models on hand in case of accident.

The beginner should use a shell pure gold matrix into which the soft gold should be packed and swaged to form the solid matrix until expert dexterity in sweating and infusing is acquired.

No man liveth unto himself. The inlay here presented with its technic is a combination of well known principles heretofore used by the profession; but I desire to give special credit to Dr. V. E. Barnes for suggestions and instruction in use and control of mouth blow-pipe which has made possible the present technic, and to Dr. H. R. C. Wilson for valuable suggestion for making Quick-Model.

NOTE—A cast gold inlay with imperfect margin may be made to fit the cavity by using the soft gold mat to correct the error and following instructions as given for correction of error in swaged inlay.

MODERN CROWN AND BRIDGE WORK*

BY C. H. BRAMWELL, D.D.S., CHICAGO, ILL.

I have models upon which I have constructed bridges using the different types of replaceable teeth. I prefer the use of the Goslee tooth because I am more familiar with the advantages of that tooth on account of having been associated with Dr. Goslee in giving clinics at the different state meetings on replaceable porcelain teeth and find that a great many dentists have considerable trouble in having the patients return with the tooth or teeth broken and in most all cases we find these conditions:

Upon close observation we most always found that the tooth or teeth selected for the case were altogether too large and before the dentist could get them adjusted satisfactorily the teeth were ground to such an extent that breaking of the porcelain could not other than be expected. Then again we would find that the teeth had been used on a close bite where an all-porcelain tooth should never be used, and again at times the occlusion was so arranged to bring all the stress of mastication on the artificial or porcelain teeth.

The most essential thing in the use of an all-porcelain or replaceable tooth is first to select a tooth indicated for the case, getting a tooth where no grinding or as little as possible is needed.

After having selected the tooth we find that the use of 38 pure gold, burnished to the porcelain, gives you a smooth surface and enables the dentist to reinforce the 38 pure gold with 22k. solder, doing away with casting. At times you can make a small bridge while you would otherwise be waiting for a flask to burn out.

Another thing to do away with the artificial appearance of your bridge work is to maintain your interproximal spaces. This can be done by extending an 18-or 20-gauge clasp metal wire from one interproximal space to the other. In this way you can extend your solder lingually and get any strength desired and still maintain your interproximal space.

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*Given as a Clinic, Indiana State Dental Society, 1914.

This is more artistic and pleasing to the eye than if you had cast, leaving about one-sixteenth of an inch of gold filling the interproximal space, and giving an artificial appearance to your work.

Another mistake the dentist makes is telling his patients, after having completed a piece of work containing artificial teeth, that this piece of work will last a life-time or be as good as their own teeth. This is not true. No artificial tooth is as strong as their own natural teeth. Patients under this impression will most always test them out and most always return to their dentist disappointed. This can be avoided by telling his patients from the start that they cannot expect as much from artificial teeth as from their own and that they must favor them at all times. If at any time one should break, they most always return to the dentist, saying, "Doctor, you told me to be careful, but I was careless and it is my fault, not yours." You can always make a charge for replacing the tooth.

This is where a replaceable tooth is gratifying to both patient and dentist. Some have trouble in getting the teeth to place after having soldered the entire bridge. This is because they have soldered too many joints at one time.

Never solder but two at one time, always filling joints as snugly as possible with small wires to do away with the possibility of shrinkage.

ROOT AMPUTATION*

BY JOHN P. BUCKLEY, M.D., D.D.S., CHICAGO, ILL.

WE WILL TAKE A CASE which you cannot cure by drugs, etc., and where surgery is indicated. Physicains are turning their attention to the teeth, and they are accusing us of more things than we are guilty of. When we find something that should be removed, we should be able to do that by means of surgery, definitely and positively. There are just two things to do. One is not to hurt your patient. I use a local anesthetic, cocaine in combination with adrenalin. You want also to control the hemorrhage. I take a Johnson & Johnson roll, cut it up into a little sponge, dip it into a counter-irritant and paint the site of operation. Inject first on the distal, and get back far enough so that when you penetrate the mucous membrane you will hit the bone. When you expel the solution see that you have a distention of tissue over the point of the needle; take your finger and press. It is surprising what little anesthetic you can get along with. Then make an injection on the mesial, and then on the lingual. I make it on the lingual so that afterwards I can curette without hurting the patient. To stimulate my patients' confidence I usually give them the mirror, and then show them the lancet. I say, "Here is a little sharp instrument, and I am going to cut your gum. I want not only to show you, but to tell you." I go in and jab it down. "Do you feel that?" "No." "Now, I will do the whole operation as painlessly as I lanced that gum." Then take the mirror away and say, "You don't care what I do so that you are not hurt?" "No; I just want it cured, and not to be hurt." I take a flat chisel, and loosen the top from one-eighth to one-fourth inch on each side of the incision. If you have a good assistant, she is there with a little sponge. I would rather not have the patient expectorate while I am operating. Then take a little tissue retractor, which is very successful, put that in the incision, and retract the tissue—spread it apart. The pressure on the claws of the retractor will lock it there. Be careful in retracting that tissue that you do not catch the claws in the bone and retract all one way. Have the claws just glide over the bone so that the root is standing right between the claws of the retractor. When the tissue is retracted you sponge, and you find that you did not lance the gum as well as you thought you did, and there is a little thread. Take your instrument and sever that, and that will lessen the strain on the retractor, so tighten it again. The resiliency of the tissue is different in different patient's mouths. Some will have enough resiliency to hold the retractor in place during the ten minutes necessary for the operation; in others, the resiliency is overcome, and you will have to tighten it a little. Sponge in there, and you can see the bone if there is any bone there, or you can see the tooth root, if there is resorption.

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*Given as a Clinic at Indiana State Dental Society, 1914.

I want you to take that bone out with the chisel and not with the bur. Chisel around the root end and remove the bone. Then sponge and you can see the tooth root. The beginner makes a mistake in slashing in there and cutting off the root. Do not cut that root off until it is free from the bone all around. You can see it now, and take a steel instrument and see if you cannot go down there and get that in between the root. If you see that the root end is not free, the part that is affected, then take a little bur and go down there. Be sure that the root end is free before you cut it out; otherwise it may get away from you. Then take three or four sharp fissure burs and cut it off. Take three or four, because they will clog in a moist field. Go as far as you can with one and it will clog, and take it off. Then take another. Use enough burs. When the root is off you will pick it out easily, if you take the precaution to free it before you cut it off. Pick it out, and take a round bur and smoothe up the edges. Then curette the whole area. That is easy when you inject on the lingual. Scrape out the whole mass of material. Take the retractor off, wash the wound out, absorb the balance of fluid with antiseptic gauze, then take a piece of sterile gauze, dip in euroform paste and pack it in the opening. This will control the after-pain. Change it the following day, wash it out with normal salt solution, then let it go two days, and pack it in loosely in the opening, let it go about three days, and at the end of that time all you need do is put a little gauze in the opening and keep it open long enough so that you are sure it is healing nicely.

SUSCEPTIBILITY AND IMMUNITY TO RAPID SUPERFICIAL ENAMEL DECAY*

BY DR. F. W. LOW, BUFFALO, N. Y.

REITERATION IS NOT PROOF, but nevertheless your essayist is about to open the discussion of the subject matter of this paper with the oft reiterated statement *that the presence of generous portions of the sulphocyanates in human saliva,* whether they may be present as a natural constituent or whether induced by stomachic medication, will be found coincident and causative of a more immune condition, relative to the activity of rapid, superficial decay of the enamel of the teeth. For the persistent advocacy of this contention during the past, now almost nine years, your essayist has been subjected to considerable criticism, some friendly, some caustic, and some censorious, for all and every kind of which he here and now desires to make most thankful acknowledgment; because he is aware that by it and in consequence of it, he has been stimulated to further study, and he hopes, as well, to better and broader understanding.

When as chairman of the committee on scientific research of the New York State Dental Society, I read its first report (1906), regarding the effects of the various constituents of human saliva upon immunity and susceptibility to rapid superficial enamel decay, among the opening paragraphs occurred this statement—referring to the apparent comparative immunity where generous proportions of potassium sulphocyanate appeared to be present: "We may be deemed somewhat temerarious in advancing the contention that the presence of the sulphocyanates has any bearing on comparative immunity, since to attempt an investigation of the human saliva is much like going into a jungle without guide or compass." To this statement was appended the following exhortation: "Let us all go in together then, and in order that we be not lost, let a beating of drums and a blowing of horns keep us within hailing distance; thus only, will it be possible that we may discover something."

Probably most of you are well aware that the beating of something, and the blowing of horns has been loud and continuous ever since, the only trouble so far being a most tremendously discordant lack of harmony—indeed, much like the participants of the celebrated Bob Sawyer's supper party, everybody has been singing the same song but to the tune that he knows best.

In accounting for immunity, coincident with generous sulphocyanate provings, your essayist advanced the theory that this constituent in saliva prevented bacteria from forming so luxuriantly upon the enamel surfaces, the so-called plaque of Black. Supplementing this report (1909) Prof.

L. M. Waugh, occupying the Chair of Histology and Biology in the Dental Department, University of Buffalo, was the chairman of our committee on scientific research; he caused experiments to be made in artificial culture media, and reported that in such culture tubes as had slight admixtures of potassium sulphocyanate to the media, that plaques were either absent or meager, and that they were less adherent to the test tube surfaces even when present and in no degree so tenacious.

Following Dr. Waugh's administration, Dr. W. B. Dunning became chairman of this committee, and has so remained up to the present time.

Investigations have been in progress for him under the guidance of Prof. Wm. J. Gies, professor of biological chemistry at Columbia College, New York.

During this time, whatever investigations the writer has made have been entirely unofficial; of these it is the purpose of this paper to give chronologically a bird's-eye view and finally to report conclusions resulting from them, at the same time mentioning briefly the opinions—that as these investigations have progressed—they have elicited from a few of our most competent American writers.

Experiences reported by Doctor Waugh were all attributed to mere coincidence by Professor Gies, and conclusions arrived at were declared erroneous; furthermore, Professor Gies condemned the administration of sulphocyanates to patients, declaring that the medicament was likely to prove poisonous while it could not be of any possible benefit. However, in this connection, it is proper here to state that as his own investigations gradually progressed, Professor Gies has modified his opinions, at least in so far as his fear of the poisonous effects of pharmacological doses are concerned. Indeed, during his last year's investigations he caused to be administered to himself—for eight consecutive days—six times the quantities ever recommended by the writer, and noted no ill effects, and in concluding his remarks at our state society meeting last year, he said:

> "My good friend, Doctor Low, and I have not yet recovered from the habit of disagreeing with each other, but I think we are giving strong evidence of a tendency to improvement in that direction.
>
> "It is a great personal pleasure to say today, that, in the light of our experimental results, there is good reason for thinking that Doctor Low's use of sulphocyanate for intended therapeutic purposes has not done any harm to anyone. In retreating to this point from the judicial position taken a year ago, I do so in accord with, and forced by, our experimental findings.
>
> "In view of the benefit to humanity that would accrue from any real prophylactic utility which sulphocyanate might possess, I hope I may have the pleasure next year, as a result of further discovery, of retreating the rest of the distance to Doctor Low's camp; although, as I size up his position today, through the same old telescope—'show me'—I think I see 'faith cure' in large letters over the opening in his tent, and the doctor himself the personification of Faithful rather than Factful."

Compared to all previous criticisms emanating from this distinguished investigator, I am fain to catalogue this as among the most friendly, and your essayist is constrained to add that upon the eventual appearance of the learned professor at our "faith cure" sanitarium, he will find a hearty welcome. He will be given a good, stiff sulphocyanate cocktail, and then put to bed in a comfortable "faith cure" cot to rest from the weariness occasioned by his long fatiguing march.

While retreats are usually made away from opposing camps, it will be observed that Professor Gies is "retreating" towards instead, and whether he decides to approach any nearer I am indeed most grateful to him for having lifted the quarantine which earlier he established regarding the admissibility of experimental sulphocyanate medication. Hereafter, you are all at liberty to experiment if you will, with a feeling of security that at least you will do no harm.

CHRONOLOGY.

1906—A scheme for comparative determination by reactionary chemical color test was instituted with the object of determining the presence or absence of sulphocyanates, acetone, glycogen, chloride, mucoid substance, ammonia, phosphate and urate.

With the exception of sulphocyanate, each and all of these constituents were found prone to be present *almost as often* in the saliva of susceptibles as in that of immunes, and vice versa. Sulphocyanates alone almost invariably proved persistent in the saliva of immunes, and invariably absent in the saliva of susceptibles.

A brief series of experiments being inaugurated to determine whether the presence of the sulphocyanates in artificial cultures of the bacteria of decay had any restraining influence upon their rapid and luxuriant growth, proved only that in its presence the bacteria developed more rapidly in the early periods of incubation, while at the end of the fourth day development in all tubes was, after all, about equal.

Another experiment tried this year was to place the same amount of saliva, thinned with an equal amount of distilled water, in two test tubes; one specimen of saliva coming from the mouth of a remarkably immune person, while the other came from the mouth of a remarkably susceptible person. Into each culture tube was placed equal amounts of gelatin, and at room temperature, side by side, these tubes were watched to see if the sulphocyanate constituent in one of the specimens had any influence upon the rapidity of the solvency of the gelatin. The saliva from the immune mouth having abundant sulphocyanate provings, dissolved one-half grain gelatin in ninety-six hours, while the saliva deficient in sulphocyanate showed that the gelatin had scarcely been half dissolved.*

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*In this connection observe a foot-note marked † at the conclusion of this paper, in which Prof. Harry C. Jones, of Johns Hopkins University, is quoted.

Still another edifying experiment undertaken at our instigation by Dr. Herbert M. Hill, city chemist and professor of chemistry at the University of Buffalo, showed that thirty-three ten-thousandths of a grain of potassium sulphocyanate expedited the solution of an equal amount of gelatin in the same quantity of saliva from the same—your essayist's—mouth, in seventeen minutes less time than the specimen not containing this infinitesimal and attenuated addition of the sulphocyanate. This report being made under date of May 8, 1906.

Criticisms brought out at our state meeting where the foregoing experiments were duly reported, were in the main, *quite* friendly.

Prof. Edward C. Kirk, in leading the discussion, indulging in the most comprehensive talk on that occasion, in part had this to say:

> "I am interested particularly in the studies which the chairman of the committee has made with reference to the significance of the sulphocyanid of potassium in the saliva. The findings, of which Doctor Low has made mention with reference to the relationship which the high condition of sulfocyanid in the saliva bears to the absence of caries, I deem important, and I corroborate his findings in that particular; that is to say, in mouths that I have examined (and I have examined many hundreds) it seems that in nearly all instances where the sulfocyanid in the saliva runs high we have less caries, or an arrest or absence of caries. Thus far I am willing to go as corroborating the observations of Michaels along the same line. We very rarely find sulfocyanid in mouths where caries is present in any quantity. As a matter of fact, I believe it is generally true that the existence of sulfocyanid is coincident with the diminution, arrest, or absence of the carious process.
>
> "But the essayist goes a little farther than that, and this is where I would be inclined to place an interrogation point after his statement. *Because* we have sulfocyanid in mouths in which caries is less than in other cases, it is not at all clear to my mind that it is the presence of sulfocyanid that has an inhibitory action on the carious process. I think it is a coincidence.
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> * * * "Consequently the point I make is, that while I think Doctor Low has been very close to the solution of the problem which led him to undertake his saliva analysis, he has gone astray, from the fact that it is not the inhibitory action of the sulfocyanid, but rather the presence of an excessive amount of glycogen or fermentable carbohydrates found in susceptible mouths, and that the absence of that food for these bacteria is coincident with the sulfocyanid element in mouths that are relatively immune."

It is true that six years later at our state meeting, in 1912, Professor Kirk repudiated all the statements that are so specifically corroborative in these foregoing remarks, by saying:

> "In a clinical way I have studied the question somewhat and I have been unable to trace any relation whatever between the occurrence or nonoccurrence of the sulphocyanates in the saliva, as indicated by the ferric chloride reaction, with any activity or nonactivity of the carious process."

Now, if Professor Kirk can reconcile these two statements, he is a more skillful logician than any other professor with whom the writer has any personal acquaintance.

CHRONOLOGY

Continued.

1910—Before retracting the report and correcting its error made by your essayist early in this year, he desires to make some comment on an editorial appearing in the January (1913) number of the *Dental Cosmos.*

It is written in the brilliant and convincing style usual with Professor Kirk, and is entitled: ''The Courage of Ignorance.''†

> ''A lack of training in the fundamental principles of science is made painfully evident in the results from time to time reported of research work or investigations as pursued by observers and students disqualified for the task, which they have undertaken,''

writes Prof. Kirk, and later in summing up the question, he says that the presentation which this same January *Cosmos* contained regarding the use of sulphocyanate as a deterrent to rapid superficial enamel decay, furnishes an ''illuminating example'' of the soundness and sanity, as well as of the fruitfulness, of the scientific as compared with the empirical method.

Undoubtedly, in the main, Professor Kirk is right; but I think he needs to be reminded that the empiric still has its place, and is, in a measure, helpful, even when difficult scientific investigations are under way. For the scientist, however astute and learned, and however capable, still is sometimes capable also of being in error. Furthermore, when disputed, he is prone to be complacent, while the empiric, however positive, goes home and begins to dig.

For the very reason stated by Professor Kirk, that while he ''does not know, and does not know that he does not know,'' still he is always at least ''subconscious'' of his handicap, and in consequence, he becomes the plodding, untiring digger, who occasionally unearths a woodchuck that otherwise might do mischief.

Indeed, it was just the subconscious realization of a handicap that has led up to the retraction about to be made regarding the relative acidity and alkalinity in the saliva of susceptibles. This error grew out of the misconception of the meaning of the remarks of Professor Ward, of Michigan University, ''That the mixed saliva of all mouths was invariably alkaline.''

As a result of repeated trials in 1910, your essayist reported erroneously that the most distressingly thick and ropy, mucinous saliva was invariably the least acid. This error came about because a certain druggist furnished on requisition for a tenth normal solution of sodium hydroxide instead a tenth normal solution of common table salt, and after standing by the "courage of his ignorance" for a spell, your old empiric—that's me—instead of going to digging, went to tasting. The truth as comprehended now is, that all saliva is *amphoteric* in reaction. That is, that it shows both acid and alkaline reaction. This will be demonstrated later by experiments more recently made in corroboration of Doctor Bunting's findings, and so far not reported by me.

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†This retraction, I think, may properly be labeled PROOF, substantiating the opinion so forcibly promulgated in ''The *Dental Cosmos* Editorial.''

From time to time during 1911-12, the writer examined a considerable number of variously interesting samples of saliva to determine acidity, alkalinity and sulphocyanate content, with the end in view of determining whatever relevancy there might be to immunity and susceptibility.

Experiments were made to determine how many cubic centimeters of one one-hundredth normal hydrochloric acid were required to neutralize the alkalinity of three c.c. saliva, using one drop orange methyl as an indicator, and how many of a one one-hundredth normal sodium hydroxide to neutralize the acidity of the same quantity, from the same specimen, using phenolphthalein as the indicator. These experiments proved so interestingly enlightening, that during the present year (1913-14) the writer has deemed it worth while to enlarge the scope of these investigations to include the question of viscosity, and to keep a permanent picture of comparative conditions of all such cases as seemed likely to be benefited by the stomachic medication advocated by him, for some time, duplicate records being made immediately preceding and immediately following a somewhat protracted course of treatment contingent upon the administration of a little compressed tablet, one of which is administered each day at bed time for a period of about thirty days.

These tablets* are prepared by Parke, Davis & Co., of Detroit, Mich., and each tablet contains ½ gr. sodium sulphocyanate and 2 gr. powdered hydrastis. Preliminary tests have been recorded of over 70 cases, the indication index cards of which are here for investigation or exhibit. Since it involves a somewhat tedious experience to furnish on demand ten or twelve cubic centimeters of perfectly fresh saliva, the writer has experienced some difficulty in inducing patients to come back after the thirty-day period required for the sulphocyanate treatment; consequently, not all the cards have complete records of before and after conditions. However, out of 33 experiments, the viscosity was markedly decreased following this line of treatment, except only in six cases: acidity was decreased in 22 out of 31 cases, and that alkalinity on a full and final general average was neither increased nor decreased materially, on account of medication, 12 out of 31 cases showing increased alkalinity, while 16 showed decrease, three cases, for lack of saliva, being undetermined.

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*I wish to say at this juncture that I have no pecuniary interest in either the manufacture or the sale of this medicament and no secret understanding calculated to prevent freely their manufacture by any other pharmaceutical firm or company.

Your essayist submits that this is such a decided record of improvement, that he is warranted in maintaining that treatment may reasonably be expected to result beneficially, and he stoutly avers that clinical experience bears out the theoretical hypothesis. Nor is this altogether a question only of his own say so. Confreres in Buffalo, who have experimentally tried this treatment—especially among their adolescent and their pregnant patients—bear witness to its efficiency, and letters from other cities corroborate their testimony.

It is fashionable just at present among the brethren of "our sister," the medical profession, to attribute morbidity—manifesting in any form of abnormal metabolism—to some derangement of the functions of some of the ductless glands; nor is this topic likely to be kept out of the discussions of morbidity in relation to dental aberrations. Witness the latest contribution of our astute thinker and convincing writer—the learned dean of the dental department of your greatest university, the University of Pennsylvania—as reported in the leading article entitled, "A Reconsideration of the Etiology of Dental Caries, and a New Theory of Caries Susceptibility," published in the January number of the *Dental Cosmos* of this year.

As the writer comprehends the argument of Professor Kirk, he theorizes that there is increased carbohydrate tolerance in the system during the entire period of dentition, from the beginning through to the age of full puberty, "resulting, among other things, in an increase sugar content of the blood," and he adds that, "we may fairly infer that sugar will make its appearance in the saliva by dialysis from the blood through the salivary glands into the mouth cavity."

Reasoning that if this were true, there ought to be some way to detect its presence, and finding that it would require a most delicate test, the following one was adopted by the writer:

To one c. c. saliva in a test tube was added one drop of a twenty per cent. alcoholic solution of a naphthol and after mixing by shaking, reaching to the bottom of the tube with a pipette, five c. c. of concentrated sulphuric acid was run in. In the presence of either sucrose or glucose it was found that a more or less vivid violet zone appeared at the line of demarcation of the two liquids. This gradually spread and could be facilitated by stirring with a glass rod.

Compared with standard solutions in water of pure cane sugar and pure glucose, it was found by colormetric comparisons that saliva varied from one ten-thousandth to less than one one-hundred-thousandth in sugar content, but out of thirty odd tests there appeared to be more sugar in the saliva of immunes than there was in that of susceptibles.

This test is said by Guilford L. Spencer—former chief, sugar laboratory, U. S. Department of Agriculture—to be so delicate a one that one part of sucrose in ten million parts of water can readily be detected.

If the above described test is not faulty, the theory of Professor Kirk is not well founded, and it seems to your essayist that if excess of sugar in the saliva accounts for susceptibility to rapid enamel decay, diabetic middle age, instead of the period of rapid growth, should furnish by far the greater number and the most convincing examples.

Now in conclusion, gentlemen—for your essayist is aware that this paper is already *more than long enough*—let me urge this one contention: Though my theories *may* all be wrong, I am sure that my practice is right, for the whole theory of rapid enamel decay sadly needs overhauling if the following three points are not well taken:

Any medication that results in the *almost unanimous* discovery, that viscosity has been materially lessened,* and that acidity has been diminished, should surely be accounted decidedly beneficial, and therefore it is that I say of soluble sulphocyanate in the saliva: *"If you don't find it, give it."*

DISCUSSION

Dr. A. Bard, Pittsburg: Doctor Skinner, in January, touched some of the high spots on which Doctor Low dwelt today.

Since Doctor Low speaks of the compressed tablets I think it is only fair to tell him of the results obtained by some of the boys. The tablets were distributed among some 25 of the boys and Doctor McMasters, of Wilmerding, made the most exhaustive tests and found the results as were told here today.

The tablets are hard to secure. Parke, Davis & Co. do not make them up except on special orders so we had great difficulty in getting them. They must be obtained direct from Parke, Davis & Co.

Dr. S. M Stauffer, Pittsburg: I would like to ask *why* the saliva is deficient in sulpho cyanite?

What is the cause of the abnormal secretions from the ductless glands?

What produces abnormal ductless glands? These are questions we must give careful consideration and eventually solve before we can make any perceptible progress.

Dr. G. V. Black said that if we could dissolve the bacterial plaque, we would have no decay. I will go one step farther than Doctor Black and say if we could only prevent the formation of the bacterial plaque, we would have no decay, and this I am confident can be done in a *large degree* by correcting our *erroneous conventional* habits and customs physically, psychologically and spiritually.

Druggists have discovered that one thousand parts of water will take up one part of lime but if they add sugar to the water it will take up thirty-five parts. What part may the excessive use of sugar play in the supply of lime salts to our system? May it not deprive the soft tissues, bony parts and blood of their rightful amount of lime? This is a very important question and should receive our concentrated thought and attention. I would like to be able to ferret it out myself.

Dr. Fred D. Miller, Altoona, Pa.: I picked up an article the other day on the manufacture of candy in the United States. It is estimated that there are two billion seven hundred million pounds of candy consumed annually in the United States, which is an average of thirty (30) pounds for each man, woman and child, and it occurred to me that this might be a large factor in the cause of dental caries—for thirty (30) pounds of carbohydrate sure is some pabulum for lactic acid-producing bacteria. I remember Doctor Kirk said that he had five children and as long as he could control their food habits, he had prevented decay in all their teeth.

Doctor Miller: I would like to ask Doctor Low a question. Doctor Low, how do you obtain the saliva for your experiments? Some authorities state that saliva is different when secured under stimulation of masticating different kinds of food, and that the saliva was not the same when obtained under a pain impulse.

DR. FRANK W. LOW (Closing): I can answer some of your questions by merely saying, ''I don't know.'' You see I am like the old Indian who has gone through the woods. *I* have *seen* the squirrel. *They* haven't *shot* him yet.

Now in regard to this talk about the ductless glands—I will read the few notes I have on this subject and then try to answer other questions:

Notes on the Subject of Ductless Glands—Professor Gies has been making experiments to determine what, if any, influence they exerted upon the secretions of the saliva, and what upon the condition of the teeth; but his findings so far have all proven negative.

Our late lamented and eminent Buffalo surgeon, Dr. Roswell Park, in a paper read before the Ohio State Clinic Association held in Cleveland, March 17 and 18, 1913, made the following observations:

''A few general statements can be made which hold good with all or nearly all of these. (The thymus and other ductless glands.)

''Each ductless gland must be regarded as having its own role, and its own purpose in the general economy; nevertheless, conditions which it is not possible here to discuss, make difficult any exact assignment of the purpose of each, or any exact description of the physiological properties of their secretions. Moreover, when disturbed, each will vary according as it overdoes or underdoes its work; in other words, the clinical symptoms associated with too great or too little activity present quite different pictures in proportion to their distinctness.''

Of the effect of the peculiar secretion of the thymus upon the growing skeleton, in Doctor Park's opinion they share in importance with the pituitary, and he adds that conditions which were formerly attributed ''to pituitary underactivity are now to be viewed as evidence of underactivity on the part of the thymus,'' and defects in dentition are common with those of the hair, both hair and teeth being epithelial products, but after all, he qualifies his observations by saying: ''In truth, the functions of these organs of internal secretion so merge into each other that it is as yet impossible to make satisfactory distinctions.''

Answer to Doctor Stauffer's question, What is the definition of sulpho cyanite? Funk & Wagnalls New Standard Dictionary (1913) gives this definition: ''A salt of sulphocyanic acid,'' and of that it says, ''A colorless bitter crystalline compound found in the saliva of some animals.''

Perhaps a fair definition of sulphocyanate—so far as dentists might be interested—would be: Such a chemical combination of cyanogen with sulphur that the stomach, intestinal and blood secretions are unable to liberate the deadly cyanogen. The chemical equation being $CNHS$.

To the next inquiry of Doctor Stauffer—''What is the cause of abnormal secretions of the ductless glands?''—I must admit I am no wiser than Professors Gies and Park, who both admit they ''do not know.''

The effects upon the teeth of the dialyzation of sugar from the blood would appear from my experiments to be *nil*. Professor Kirk would be the person to enlighten Doctor Stauffer concerning this inquiry.

Answering Doctor Miller's question—During the painful periods of dental operations, however brief, my beaker was on my tray ready to gather in the abundant fresh flow; possibly this may not be altogether fair but it takes advantage of opportunity, and at times when the salivary glands are at rest it is difficult to obtain ten c.c.

†Regarding the effect of Soluble Sulphocyanate Solutions upon the Viscosity of Water.

''Conductivity and Viscosity of Mixed Solvents,'' by Harry C. Jones, Prof. of Physical Chemistry, Johns Hopkins University, Memor. No. 80, 1907, P. 197.

''It is of especial importance to note that Potassium Sulphocyanate shows a marked negative VISCOSITY (positive fluidity) in water.''

SYNTHETIC PORCELAIN*

BY DR. H. G. WOTHERSPOON, PHILADELPHIA, PA.

There are two important points about this material that should be remembered. *First*, the preparation of the cavity. *Second*, the mixing time and consistency.

Do not run the cavities to an acute angle at the cervical or the incisal margin; that will give it the tendency to chip. It is better to run the lines of the cavity more in a box form, or having them parallel to the enamel rods, which avoids feather edges and gives you strength. I would not take any chances of running the cavity to the incisal angle as it not only weakens or cuts off the enamel rods, but it produces the feather edge. Better get the confidence of your patient and take a chance of restoring the incisal edge, or the most satisfactory results may be obtained by a combination skeleton gold inlay and synthetic labial front, not forgetting a window in the lingual portion of that inlay to transmit the light.

Use a round bur for your undercuts as a plastic material bridges the angles left by the use of the inverted cone, and you are liable to have a pocket of air in your cavity.

The success of synthetic depends upon the mix. You will notice they speak of thorough incorporation, not thorough spatulation. Forget that you ever mixed an oxyphosphate cement but remember your plaster of Paris mix, getting that powder saturated with the liquid as quickly as you can, and force the absorption. A minute is good mixing time; one and one-half minutes is too long as it breaks up the crystals as they form.

The first batch of powder added to your liquid should be large—twice to three times as much by bulk—quickly incorporate this. Then smaller quantities are added until the material is thick enough to pick up. Then by kneading, make it a homogeneous mass and test it by placing the flat blade of the spatula upon the mass and raising it. You should have a slight adhesive feeling, but it should not follow the spatula or string; look for the point where the watery glaze just leaves the mix and you begin to see the sugary appearance; then you are correct.

Take into consideration that everything should be clean, and to make sure of this, wipe your spatula, slab and instruments with alcohol. In warm weather, if you are bothered with quick set, chill your slab under cold water; or you may take the old style clay flower pot, stop up the hole with wax or modeling compound, keep it filled with water in a draughty place. This will keep your slab cool and just above the dew point.

Use an agate spatula as metal discolors, and bone or ivory wears off in the mix. In as few pieces as possible place the material into the cavity with a wiping motion. Then work the synthetic into the undercuts and back to the lingual margins with a pointed instrument, force plenty of material against this margin as it is better to have an excess than not enough. Draw your celluloid over the material at an angle, bringing the pressure at the cervical side of your strip. Your filling is practically finished from the gingival margin to the point of contact; the excess from the point of contact to the incisal margin can be finished or trimmed ten minutes after the filling is inserted with fine mounted carborundum stones.

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*Given as a Clinic at Indiana State Dental Society, 1914.

You may polish your fillings at the same sitting or at a future time. The latter method will bring the best results as there is less chance of disturbing the margins and your filling takes a better polish.

Always protect your fillings from the atmosphere by cocoa butter, and use plenty of the butter when polishing. If you so desire to polish at a future time, you may varnish your fillings immediately after you release your celluloid strip, and dismiss at once. You must protect your fillings from the saliva at least four hours, and your fillings should never be exposed to the atmosphere while hardening. Cocoa butter prevents this. While the varnish or wax protects the fillings from saliva, cocoa butter is not protection enough from the saliva.

PRESIDENT'S ADDRESS*

BY W. E. KENNEDY, D.D.S., INDIANAPOLIS, IND.

IF YOU WILL PARDON brevity in my address I will be equally as grateful to you as you are that I have chosen to be brief.

With the great work of reorganizing our State Society with the National Association and the splendid progress and achievement along this line by our zealous, ever-working, never-tiring secretary, Dr. King, I feel and know that any suggestions by your president are quite unnecessary. I would therefore urge all to rally, individually and collectively, under the standard and help to carry the reorganized society on to a perfected, successful, co-operating unit. These few suggestions, however, I wish to submit:

First: I would magnify the fact that Indiana, for the last two years, has been in a transitory state of reorganization; that we have always had a constitution and by-laws which provided that if you once joined the Indiana State Association, you always remained a member in good standing thereafter, if you did not attend the meeting, without paying any dues at all. Our organization probably is the only one on record that conducts its business in such a loose, haphazard method as this, for no organization can be builded upon a permanent foundation unless it has assured resources enough to weather it through times of adversity as well as times of prosperity, and while the Indiana State Dental Association has always prospered under this plan, yet it has been a mystery as to why it has been a success. Nevertheless, since we have voted to affiliate with the National Association, it has

*Read before the Indiana State Dental Society, 1914.

become necessary for us to change our constitution to conform to that of the National.

The constitution and by-laws will come up for passage during this session and we are all anxious that everyone should display the most enthusiastic, co-operative spirit and see that we have a constitution that will compare favorably with the other State Associations. In fact, we would like to have a constitution and by-laws that will be a model for other state societies.

Now, in this transitory period from the non-payment of dues to the annual payment of dues, there will be some misunderstanding, and it will take us some time to adjust ourselves to the new condition under which we will be operating, but in the end we will have builded our organization on a permanent foundation that will mean a future financial success and a perfect working organization.

There is another matter in connection with our constitution and by-laws that should be brought to the attention of the Association and that is that we are trying to organize the entire state into component societies. This will mean that the secretaries of the component societies will have jurisdiction over certain territory and that no man can get into the state association unless he is already a member in good standing in his local society. I want to magnify and impress all in hearing of the importance of every member being made familiar with this fact, and that all present assist with spirit and urge the importance of this to every member of the association to avoid misunderstanding in our organization later on. Many of the states in the union are already organized until they have no unorganized territory left in their state. Ohio has just completed its organization and six or eight other states already have a perfect working organization by the component society method.

Second: I wish to impress upon you the fact that we are going into the National Association and that we are all anxious that Indiana shall make as good a showing as possible, not only in regard to the number of members that are going into the National, but especially are we anxious that the men selected in this meeting as delegates to the National shall be the strong representative men so that Indiana shall play a prominent part in the House of Delegates of the National Association and thus our association will secure the prestige that will come to us from having had a strong delegation elected at this meeting.

Third: I want to call attention to the fine program that has been arranged for this session and I would personally give credit to Drs. King, Meeker, Stoeckly and Lucas for the hard work that they have done to make this meeting a success.

Fourth: May I call your attention again and again, please, to the extraordinary progress that has been made in dentistry during the last year or more as represented by the results of the Scientific Foundation and Research Commission's report and also in the fact of the large number of magnificent state meetings and by the enthusiastic manner in which every state is falling into line with the plan of reorganizing the National. As the National will have a membership of between 12,000 or 15,000, it behooves Indiana to be in the very forefront in this great movement for better things in our profession.

The time has come when we are at the very threshold of entering into the promised land, so that the dental profession may be recognized by other professions as a truly scientific profession. The gauntlet is thrust into our faces not only by the great leaders of the dental profession and by the medical profession, but by the public. Are we efficient, are we sufficient to meet the demand of the eager, alert public? If we are not ready, if we are not prepared, if we are found wanting, our source of supply will be cut off. We will be surrounded and besieged by a multitude who will starve us out by leaving us alone. I mean you and I and some one else; not the profession. The great majority are sensitive to their responsibility and are prepared. The rest of us must get busy and our help and salvation is study and research in the great school of the numerous dental societies and dental journals throughout the land. Hence our attendance here and therefore the necessity of our co-operative, active membership with the reorganized State Society.

Fifth: I wish to announce that all sessions will begin on the very minute. Your co-operation in dispatching the routine and business of this meeting in every detail of the program is earnestly requested. Please be on time *every* time, *all* the time.

FROM THE BORDERLAND OF MEDICINE AND DENTISTRY

BY HERMAN PRINZ, A.M., M.D., D.D.S., ST. LOUIS, MO.

DIRECTOR OF THE RESEARCH LABORATORY, WASHINGTON UNIVERSITY DENTAL SCHOOL

(Concluded from page 887, November Summary)

John P. Sawyer, M. D.: I shall not exhaust the list of synonyms and adjectives to be culled from the dictionary in expressing my pleasure and delight at the paper we have heard this evening. We have all enjoyed it, none can have failed to do so. With so many present who have a far better claim to your attention, I shall speak of only two or three points. One, on the "borderland." How often, with the same ideas, we use different words and get into apparent antagonism that does not exist. Whether we call it borderland or neutral zone, or sphere of influence, or what not, the fact remains that as medical men and as dentists we are working with human bodies; we are dealing with processes which in every field of special study emphasize and illustrate and evidence the unity of processes which make up, when well understood, the science of physiology that Dr. Stewart used to teach us. And as therapeutists, as men who treat disease, so-called, we really do not treat disease, we merely favor the resistance or physiological power of the individual. Whether we are surgeons, internists, gynecologists or what not, we simply, in our various activities, bring to bear upon the individual who is under our care, what measure of knowledge we may have, to produce favoring conditions for the development of that individual's endowment of resistance and of recuperative powers. Our drugs, measures, procedures, all are stimuli or the equivalent thereof, and there can be no sharp separation between men who work in different fields from different points of view upon the same general processes. We are all akin, all alike, all one people, of one general profession, though following special fields of work. Hence, research in any of these fields makes for common gain, and is of common advantage.

Now, another point to which I wish to turn is that in the particular nook into which I have been crowded, against my will and my protest largely, I find great help and great benefit from my dental colleagues, some of whom I know, many of whom I do not know personally. But it is my practice habitually to examine the dental outfit of my patient, and I often suggest that it is useless to try to do for him, to help his physiological powers of digestion, unless he supplies himself with the approach to a physiological dental outfit. And so I feel that I serve on an outpost over the border, or the neutral zone, or the sphere of influence, whatever it is, of the dental profession, over in the medical nook, and I call upon the dental men to help me out, and they do, most splendidly.

Now, all that has been said concerning the influence of mastication, the importance of it, is an old story. It is no place for me to bring coals to Newcastle here, and I shan't do it; but I should like to emphasize the fact that the many people who have good teeth, either their own or supplied, fail often to utilize them; fail in their physiological processes; and even though you do splendid dental jobs, I would call upon you to add a little physiological lore and step over into the medical nook, and tell people that having such good products of your skill, you will be particularly offended if they don't use them. I would urge you to speak to your patients of the importance of mastication after the work is done as well as before.

John Phillips, M. D.: I must say that I have learned a great deal tonight, particularly from the paper read here by Dr Prinz. I have been particularly interested in the question of oral sepsis for several years, since the first publication of Dr. William Hunter, of London, on the subject. Shortly after his paper first came out, I saw at Lakeside Hospital a patient, a physician, who came in with a diagnosis of typhoid fever, and he himself, and the nurses and the physicians thought that he was suffering from that disease. And at the same time we found, on examining him, that he had some suppuration about one of his teeth. Dr. Stephan removed the tooth, and his temperature, which had been running from 104 to 105, dropped to normal in the course of twenty-four hours, and there was no further trouble.

In our clinic at the hospital, where very few of the patients know the art of using the tooth brush, I find that probably 70 or 75 per cent. of them, as a conservative estimate, have bad teeth, often with a great deal of pus welling up from the gums around the teeth, and I think that is one of the big factors of ill health. I have very often said, in the dispensary clinic, that if we could eliminate bad teeth and constipation, we would have very little to do.

There are certain other things I would like to call attention to as I see them in my own practice, and one of those is the question of malnutrition in children from carious teeth and suppuration about these teeth. We often find children with poor appetites and with flabby muscles, and we find that some of the teeth are carious; sometimes you will see a great deal of pus coming up between the gums and the teeth. We find that as soon as the teeth are taken care of, the child at once begins to thrive. I rather hesitate in saying, in the presence of such an audience, that sometimes I think the physician has a little difficulty in getting the dentist to take care of suppurations or carious teeth, especially the first teeth.

Then, of course, as has been mentioned here, there is the question of septic gastritis and various other affections which I think are best described in Hunter's monograph, and there are certain conditions which are the result of oral sepsis, which I very frequently see, to which I would like to call attention. One of them, of course, is the various forms of anemias, particularly secondary anemia. Sometimes they are so severe that you may be in doubt whether you are dealing with a secondary or a pernicious anemia. I remember particularly a woman I saw not long ago with such an affection that those examining her were in doubt whether they were dealing with pernicious anemia or a secondary anemia. When I made the examination I could only find pus coming out from some of the teeth. I said I didn't know whether that was an etiological factor or not, but at any rate it should be taken care of. To my surprise, when I saw her six months afterwards, her anemia had practically all disappeared, and I learned that the dentist had found that this tooth communicated with the antrum, and that there had been a serious affection of the latter as well. I have also seen severe forms of septic nephritis, following, I am sure, carious teeth. I might name a great many more conditions that I see in my own practice or in the dispensary work, but time will not permit. I would like, however, before closing, to express my personal appreciation of the paper of Dr. Prinz tonight.

Dr. S. B. Dewey: I agree somewhat with Dr. Ebersole in reference to the borderland between dentistry and medicine. Really there is no borderland, or should not be—to the educated dentist there is not. Dr. Prinz speaks of the preparation that we should make to be in that land, and I will first say, in reference to there being no borderland, the dentist is practicing a specialty of medicine, just the same as the eye and ear man, or the rhinologist, or any other specialist, and that the educated dentist is as well posted in general medicine as is any other specialist, unless he first was a general practitioner, far better than our medical brother is on dental topics and that he should study on medical lines, give his attention to medical lines just so far as they are relative to his specialty. As has been stated in the paper that it is unnecessary (Dr. Stewart refers to it) for the dentist to spend much time in reference to the wrist or to the extremities, that is all useless, because he knows he will have nothing whatever to do with them. The more specialties we have, the broader will be the field of medicine. Each specialist, exerting his greatest energies and efforts in the line of his chosen work, will increase and expand in the special direction, thereby adding to the general medical fund. There is one trouble with all of us, and that is our fear of admitting that there are things that we do not understand in our chosen calling; and a frank confession of ignorance will often lead the inquiring mind into the light. It is no disgrace to say that we do not know, but it is a disgrace not to know and not to try to find out.

I think that the broadest field in future medicine is along the line of the ounce of prevention. And, by the way, the dentist today is doing heroic work in that direction, that we should give more attention to the oxidations within the body and the tissues and to the organs of secretion and excretion, keeping them in such balance that they will take care of the poisons that are formed in the body, making them easily eliminated. There is not so much to fear from the formation of poisons, but it is the accumulation of poisons that gives us our trouble. Many claim that specialties narrow a man. Perhaps they do, because he has not time to go into other fields perhaps as much as he would like, and even the laity give us credit for not seeing things that are over the fence. When our president introduced one of the speakers as a gentleman who had more inside facts than any other man in the city, it made me think of a little circumstance that happened a few days ago, in reference to not seeing over the fence and the way the laity looks at it.

A lady, consulting me with reference to some neuralgic trouble in the face, said that she was about to go to her physician and take advice in reference to the neuralgia, but she said that he would be sure to use that pump, and she had a horror of it. (Laughter and applause.)

Our essayist has made the statement that the most interesting of all the inflammations in the mouth, concerning the tissues of the mouth and associate parts, is shown in the inflammations that involve the glands in the sub-maxillary region. Now, I think that apical pericementitis and its involvement of the gland in the digastric triangle is of far less importance to us as dentists than those inflammations that have their beginning at the gum line and that involve the lymphatic cells that are in the peridental membrane. I speak of those diseases that are commonly called pyorrhea. It matters not what prefix we put before the pyorrhea, it has its beginning in faulty nutrition in the tissues immediately surrounding the tooth socket. These lymphatic cells that are in the peridental membrane are active factors in eliminating the poisons that accumulate in the system. It matters not whether the poison be caused by gout or rheumatism or lead. In the case of diabetic poisoning that the essayist speaks of, the cells are active, and are trying to relieve themselves of the poisons surrounding them. The membrane, through malnutrition, breaks down, becomes infected, and we have diabetic pyorrhea.

Then the mercurial poisons that he speaks of, those lymphatics there appear to have a special tendency toward eliminating mercury and its compounds, the iodides, and giving the blue line at the gum that he mentioned. Now, he also states that in the infant and in the edentulous old age we do not have the appearance of mercurial stomatitis, but he does not tell us why. I apprehend that the reason why we do not have the appearance of it in these people, in the infant and in old age, is that these lymphatic cells in the peridental membrane disappear in old age, and therefore there is not that activity at this point trying to carry off the poison; and of course the infant has no teeth, and there is no peridental membrane to be active.

Dr. Crile spoke about the tooth and its being affected by certain diseases, melting away and disappearing, or being readily decayed, and so forth. Now, I do not apprehend that the tooth of an adult can be affected from internal breaking down, that after the tooth is once perfectly formed and the pulp of the tooth has receded to the position which it takes after complete development, there is little or no internal change in the tooth. The effect is all in environment; that is my opinion, I don't see how it can be otherwise. Of course we do see some marked cases of dissolving of the tooth structure, especially in the nervous diseases. Some of the most marked cases that I have ever observed were in neurasthenic patients.

The paper is one that has been very interesting to me, and the discussions which followed were of great interest and importance. By the way, I would like to add a little to Dr Biggar's remark in reference to the advantage which the dentist had over the physician. I think the physician has the advantage over the dentist. The dentist has his mistakes paraded before him every day; the physician buries his.

Before I forget, Dr. Crile, you spoke about extreme acidity in the mouth. I don't think that we have free acid enough in the mouth to cause any serious trouble, that is, free acid I am speaking of. It would become diluted so soon as to be inactive. If ravages are made upon the teeth from acid conditions, they are caused by nascent, not free, acid.

Another source of infection in the mouth that is not often thought of or given due attention by the dentist, is the ragged and saw-tooth-edged teeth, that will scratch the tongue and cheeks, making abrasions where infection may enter, and this is specially to be guarded against in patients of middle life. Keep the teeth polished, polish the surfaces or restore them so that there will not be this abrasion, because where there is so much infection in the mouth, abrasion, in middle age, especially will often lead to serious consequences.

C. B PARKER, M. D.: It just occurs to me that when my own dentist invites me to come and see him, as Dr. Ebersole says, he starts something, and usually something very painful. It is not Dr. Biggar's dentist who never hurts him. I have a suspicion that Dr. Biggar's dentist works on different kind of teeth from mine. (Laughter and applause.)

Gentlemen, I must thank the essayist of the evening for the pleasure he has given me individually, and for the amount of knowledge he has imparted. And I have a feeling that it takes a good deal of courage for a man of his reputation, of his great learning and knowledge, to take up this subject: the Borderline of Medicine and Dentistry. It has been my fortune to listen to very distinguished medical men, brought from a distance to address our medical society, and too often they feel that they must impress the Association with their greatness, with their ponderous knowledge, and they often dig up some very erudite or unusual thing, or some hobby that we are not interested in. I have no doubt the distinguished essayist has many subjects which he has worked upon that would not be of general interest or practical value, and therefore I think he exhibited a great deal of courage in presenting his article.

As an old student of Jonathan Hutchinson, I can scarcely pass without remarking the importance of ''Hutchinson's teeth.'' I grant that all deformities of the permanent teeth are not due to congenital syphilis, but that I saw in his clinic and I have seen in my own private practice, conditions of the upper central incisors and the upper canine teeth, associated with interstitial caritis, that when I have to deal with such teeth, I don't feel that it is necessary to make a Wasserman test to diagnose syphilis.

Now, there is just one other point I am going to call your attention to. We have become so accustomed to assign to Lord Lister the whole credit for the introduction of asepsis into surgery, that I think we, as Americans, have overlooked one of our own countrymen. If you will take the trouble to look into the history of the War of the Rebellion, you will find that in 1864, three years before Lord Lister published his work on surgical asepsis, President Lincoln sent Dr. Middleton Goldsmith down to Nashville to see what could be done towards staying the terrible ravages of hospital gangrene in that city. He found the hospital in a country church, with sheds for the horses in a court adjoining it. He found that the patients were in the church auditorium; that the patients lying along the wall toward the court were affected first, and those on the side toward the street were affected last. He found also that between the windows there were three beds, a bed near each window, and one between these two. He found that the patient in the bed next to the open window was affected before the patient between the two windows, and he said, ''There must be something in the air, and it must be coming from the outside through the window.'' He looked out of the window, and there were the soiled bandages festering in the hot sun. He cleaned up that court yard and burned the refuse. That was in 1864. He said, ''There must be an invisible something in the air, that comes up and pours in through the windows and then is carried across the room, possibly by the nurses, possibly by the instruments, or both. We must find something that will destroy this contagion.'' Up to that time he was as clear on the germ theory of infection as Lister. Unfortunately he made a poor choice of an agent. He chose a substance 600 times as powerful as carbolic acid, as an antiseptic and a germicide, but utterly intractable, very destructive to the tissues as well as to clothing and instruments. He chose bromine. He used it in solutions far stronger than necessary and slushed it onto gangrenous wounds. You younger members of the profession have never seen hospital gangrene, but it was a terrible scourge. He caused great suffering and destruction of tissues but he stopped hospital gangrene. Lord Lister first used the carbolic spray, and we know that he gathered up the germs in the room and brought them down on the wound. Carbolic acid is abandoned now, nobody thinks of using it except in England. But it seems to me that there ought to be a place for our distinguished countryman, who, three years before the published teaching of Lister, established the great fact that there was something in the air due to filth, a miasma that could be carried in the air to the sick, and when it was destroyed, the disease ceased. I think you will find the facts as I have stated in the medical history of our great rebellion, so I think our American doctor deserves some recognition in this connection.

WILLIAM E. LOWER, M. D.: Mr. Chairman, I have too wholesome a respect for this organization to attempt to address you on this subject. I simply want to say that I have been greatly instructed. I think it has been a great opportunity to have been invited here tonight, and I appreciate it very much indeed. Inasmuch as the essayist has not touched upon the borderline between the oral cavity and the particular branch of surgery that I am especially interested in, I perhaps will not be allowed to say anything. There may be some relation, no doubt, but he has not spoken of it. But the fact that there is a closer interchange between this association and the medical profession I think is a good omen, and I feel that before long we will be working closer and closer and in better co-operation than we have ever had before, to the great advantage of our patients as well as to our own advantage. I thank you very much for the pleasure of being here.

JOSEPH F. HOBSON, M. D.: It seems to me that the medical profession is monopolizing the speaking tonight. I didn't come here to hear doctors, but to hear dentists talk. However, I was having what Dr. Biggar called a "hell of a good time" until you called on me. I feel somewhat embarrassed, but I feel somewhat different from Dr. Sawyer. I feel that I haven't a sufficient quantity of adjectives to apply to the speaker and the address of the evening. I feel, as many have said, most highly gratified and greatly instructed. I feel that all of us will carry away from here tonight things of inestimable value to us in the practice of our profession.

I think few members of the medical profession think as much of the asepsis of the mouth as we should. I have been negligent in my practice for a good many years. I have known in a general way of the value of the perfect hygiene of the mouth, and I know I will think of it more hereafter. I thank you, gentlemen, for the opportunity to be here.

H. J. LEE, M. D.: I feel entirely incompetent to discuss the essay that we have listened to tonight. I have enjoyed it, and I think, as Dr. Hobson has said, that it will be a benefit to us of the medical profession to have been here. It certainly has set us thinking along lines which perhaps we haven't thought enough. I have enjoyed it very much, and am very thankful for the opportunity to be here.

S. W. KELLER, M. D.: Mr. Chairman, I understood when I came up here, that there was to be nobody called on to speak but those who were on the program. I knew I was not on the program, but I am led as a lamb to the slaughter.

It is curious how circumstances alter cases. I have seen the time when I would have liked to say something to dentists, about dentists, and what I would have said then would not have looked very well in the *Ladies' Home Journal.* There are a good many subjects that one certainly thinks of in listening to the essay that we have heard tonight and the remarks that have followed. To touch upon even a small number of them, would take more time than you would want to waste to listen, but I was thinking of the many things I have learned from dentists in the line of the world's surgery, some excellent work I have seen at the hands of oral surgeons. G. V. I. Brown, of Milwaukee, taught me many things. Some things we learned to do from Brown, and some not to do, and so, among my friends around in the dental profession I have learned a good deal at different times.

The question of the teeth of children has interested me greatly for many years. There is not a bit of doubt that there is a great deal more to be said on that subject; too little attention is paid to this. Of all the noise that is made about the attention in the schools, and necessarily, no doubt, about the care of the eyes and about the ventilation, and all the rest, I don't think there has anything more important been done than from the dental point of view. I think it has fully as much to do with the child's general condition, if not more; perhaps more diseases spring from it, of general nutrition, in these cases of anemia, gland affections, Still's disease, and obscure general infections—a great list of them that it would tire us all to run over, even. It is a question that not too much can be spoken of. It would seem, in fact, after what we have listened to tonight, that instead of the dentist learning the doctor's profession first, the doctor ought to learn the dentist's profession, if he wants to be a doctor, and take that into his education. At any rate, he ought to know something about it. I am greatly obliged to the essayist of the evening, and would like to express my thanks to him for the pleasure of his paper, and to the gentlemen for the pleasure of being here.

Edward Lauder, M. D.: In the last number of the *Ohio State Medical Journal* is a very able article by one of our local confreres on eye troubles originating from the teeth. We occasionally get conditions of the cornea, and again of iritis, and three years ago last month I was asked to see a lady that had been confined to her bed. I didn't know that she had been seen by three physicians, and that a condition of cavernous thrombosis existed. Through a little instrument I examined the interior of the eye, and I eliminated the possibility of cavernous sinus thrombosis because of the condition I could see in the eye. I was ignorant of the fact that a diagnosis had been made of cavernous sinus thrombosis. I thought it might be a condition of cellulitis. I found that she had been to the dentist a few days before this eye trouble started, that some teeth had been extracted, and some pus had been found at the end of the teeth, and that this infection extended up to the orbital tissue. It ran a very good course, and instead of dying she made a very nice recovery. So that was a lesson to me to be very inquisitive as to conditions of the teeth when we find such a serious condition existing. I have been well aware that the teeth were important articles, but never so much aware of the fact as I am now, and I wish to thank the essayist for his very valuable article.

Dr. Herman Prinz: I wish to thank you very heartily for the very, very kind interest that you have taken in this little effort that I have made in presenting this paper before you. It would be taking too much time to enter into a detailed discussion of all that has been said that probably needed some reply. As far as my dental friends are concerned, I am not afraid. As far as my medical friends are concerned, I would be somewhat leery on the subject, and we would really overstep our borderlines, because some objection has been made to the term.

Now, the general discussion has been so favorable that it is almost unnecessary for me to say anything, but one or two remarks will probably necessitate a few words of explantion. Dr. Ebersole started out with the fact that he had to start something, consequently I have got to come back. On the other hand, so far as the medical gentlemen are concerned, there was only one specific remark that I would like to set clear. If I remember right, Dr. Parker spoke about Hutchinson's tooth. The statement he made was undoubtedly true, but at the same time he will recall that I said that Hutchinson's tooth has a typical characteristic, a diagnostic sign of syphilis only found in twenty-five per cent., which could be verified in a large number of cases. So far as the teeth are concerned, that is probably the correct proportion.

Dr. Ebersole started out by saying that the divorcing of medicine and dentistry in 1839 is the fault, in some way or another, of not developing the science of dentistry as such. I am personally convinced that when this separation took place a great and serious mistake was made, but understand, I am only morally convinced of that fact that there would be this possibility. On the other hand, we do know that dentistry as such, from that period on, from 1839, has developed so remarkably, so far ahead of any other branch of medicine, that we are gratified to think that it must have been due to the fact that it was separated from medicine, simply because, in all those countries where the separation has not taken place, where it is a permanent necessity to obtain a medical degree before you can practice dentistry, as for instance in Austria and Italy, we find that with the exception of a very few men, the dentists are the poorest lot that can be found, and that those men who sail under the flag of dentistry usually merely keep in existence, except perhaps the American graduate, who is not required to obtain a medical degree. That fact is absolutely established.

The question arises then, whether it is good to unite the two branches. I think we would do far better if we followed Dr. Stewart's advice, adding a little more to our biological knowledge, increasing our three-year course to a four-year course, and raising our entrance requirements. This will be quite sufficient for the very near future, as far as the development of dentistry is concerned. And as far as medical knowledge and education goes, we haven't much to say, except that a little more dentistry for the medical practitioner would not do any harm. (Laughter and applause.)

The objection to the title of "The Borderland" is a matter that requires personal explanation. It doesn't make any difference whether you call it borderland or sideland. A title had to be chosen, and it appealed to me that this title, because I was informed that medical men would take part in the discussion, would probably be more fitting to them than if I should come here with a subject which was simply and purely of a technical dental nature. And when I saw the postal card where I looked upon the names of the men that were to participate in the discussion, knowing them by reputation, I was very shaky in my boots to appear, indeed. I thought, now, I come here with a subject which, as far as the medical part is concerned, is of such daily occurrence to them, that they would think, "Now, this embryonic attempt of this little man from St. Louis on a text that is so well known—why should we listen to him?" I am pleased to state, however, that they found something that interested them, that probably they had forgotten or they might even never have known it. (Laughter and applause.) It is extremely pleasing to me. So then, upon that basis, I can say that I enjoyed the discussion, that I enjoyed the presence of you gentlemen here, and that I enjoyed most excellently the hospitality which you have offered me; and all you have to do now is to say "come again," and I will do it.

"EMPIRICAL" OR "PROFESSIONAL" PRACTICE WITH ASCHER'S ARTIFICIAL ENAMEL?

BY C. M. BALDWIN, D.D.S., TOLEDO, OHIO

THERE CAN BE NO QUESTION that, to a large extent, for ten years the profession has used Ascher's Artificial Enamel more empirically than professionally. The entire silicate question has been treated in the same manner. How long should such a condition exist without making an effort to correct it?

A few definitions will help our understanding of terms related to the subject, viz.:

Webster defines *Empiric* as "one who relies upon practical experience and disregards all theoretical study;" "without due regard to science;" "in medicine one who deviates from the rules of science."

Professional as "conforming to the rules or standards of a profession."

Science as "knowledge of principles or facts—knowledge classified and made available in work, life or search for truth."

Pioneer as "one who goes before, as into the wilderness, preparing the way for others to follow; as pioneers of civilization; pioneers of reform; pioneers in science."

With these definitions kept clearly before us we will try to analyze some of the important factors in the silicate problem, as they influenced practice during the pioneer days.

Many of us probably failed to realize at the time that we were pioneering, or to what extent, and most certainly none knew what pitfalls and adventures awaited us. On the contrary, none could foretell the success of the future, nor the means by which it was to be achieved; but that is the condition of pioneer life.

A statement by any man or group of men does not necessarily establish a fact. *A fact exists, or is something,* and *truthful statements about facts or things* help us to know more, giving the opportunity at least of forming correct instead of incorrect views about them.

One of the most difficult and important things in life is to distinguish true from false statements. Knowledge and ability in certain lines are necessary to enable us to discriminate accurately.

Why has there been so little progress in knowledge and use of silicate cements?

After over seven years' personal contact with dentists throughout most sections of the United States and important cities in Canada, discussing Ascher's Artificial Enamel with them, it is very apparent from their statements to me that, other than from a purely empirical sense of loss or gain, there has been but little growth in real knowledge of the silicate problem.

Ten years ago a profession whose standards were gold and porcelain, was suddenly confronted with Ascher's Artificial Enamel, which was proclaimed by its distributor to be a permanent filling material, etc. Too many accepted the claim unchallenged, and too few proved it to be true, or even tried to do so. At once it was placed upon a pedestal beside gold and porcelain without clinical proof of its permanent qualities; it was crowned before it had demonstrated its right to the position.

So far as we knew, the immense chasm between oxyphosphates and gold had been bridged without a single pillar of support, except that of hope.

It certainly was an *artificial standard* that had been set up and being wonderfully attractive, led to many misstatements, much misuse and consequent dissatisfaction. "Prove all things," etc.

Within my hearing, four or five years ago, a dentist inquired of a prominent clinician who had just completed a large restoration, using Ascher's Artificial Enamel: "Doctor, how does it compare with gold?" to which the clinician instantly and brusquely replied, "Better than gold." Such snap judgment because of an earlier favorable promise, was not and could not be reliable.

The only natural thing to do would have been to accept the material as probably being an improvement over the old cements, and then try to make it as valuable as possible, which value could be determined only by sufficient clinical experience.

The only thing definitely and positively known about these fillings, compared with others, was that their immediate beauty and naturalness surpassed all others, except the most perfect porcelain inlays, and that the process of insertion was extremely easy, requiring but little time and energy from either patient or operator.

Had early promises and hopes been realized, and had methods as practiced been followed by the full measure of success, evidently hoped for and expected by dentists, and promised patients, Ascher's Artificial Enamel not only would have *revolutionized*, but it also would have *demoralized* the dental profession.

Among other early results, people soon were informed by some dentists that all kinds of defects of the teeth could be corrected by "re-enameling the teeth," and newspapers, show windows and signs were used to spread broadcast the good news, together with the prices, which were but little higher than for cement fillings.

What a blessing to humanity! Truly the dental millenium had arrived!

There could have been no possible criticism from patients had these reports of wonderful success really been based upon facts; but what would have been the effect upon the dentist?

A little imagination will enable us to realize that about the first result to develop would have been the absolute and total disuse of all other filling materials, which not only would have caused "pluggers to be laid aside," but would have ruined manufacturers of gold, porcelain for inlays, amalgams, cements, etc.

"No gain without some loss," we repeat, and so long as it is not our loss, feel quite contented:—but let us follow the effects a little further.

By its magical properties, everyone's fillings would have become equally valuable.

Very soon after the establishment of such a practice, very nearly all operators would have been compelled to reduce their *fees* to the level of the *lowest prices*, as all fillings would be equally good, regardless of who inserted them, because all would be using the same kind of material, and that of itself was sufficient evidence of equal results. The fees asked by different dentists could hardly vary much, as they could be based upon non-essentials only, rather than upon the value of the fillings.

Possibly another great advance would have developed before long, by which it would have become possible for *patients* to fill their own teeth, after cavities had been prepared by the dentist, and he could sell the material to them!

By this time the dentists' work would have become very easy, and patients delighted; but why stop there? It would have been so easy for someone to invent a "Cavityite," or "Cavityine," that could be applied by the patient, "*always before filling the cavity*," as the only preparation required; all to be purchased at the drug store, and, probably before long, at the 5-and-10-cent stores!

This very absurd picture, carried to the extreme, only shows that we really would not be at all pleased or long satisfied to enjoy a high degree of success obtained *without being obliged to render some fair equivalent.*

One keen old dentist saw such difficulties very clearly when he put the question: "Will young, inexperienced dentists be able to put in just as good fillings as I can after my long experience?" I replied: "Skill, knowledge and conscientious effort are playing their parts in this new work, just as in the old fields, and we must learn to *adapt* ourselves to the new conditions to secure the best results."

A professional man takes his place according to his natural ability, training, experience, and the energy he exerts, while a profession takes justifiable pride in requiring a high standard of excellence in those who wish to become legitimate members of such a high calling.

Nearly all operations have been taught in our dental colleges, but silicate work has received very little if any attention there; and for the large majority of dentists in practice, silicate materials were, in the modern sense, unknown when they received their college training. I inquired of a Dean of one of our colleges, "Why do you not have this work regularly taught in the college?" and he replied, "The faculty is more or less divided about it, and then we have no one who could teach it." That happened several years ago.

Soon after Ascher's Artificial Enamel appeared in this country, its popularity grew so rapidly that men in large numbers sent money with orders to insure prompt delivery of material, but the demands far exceeded the supply and many were kept waiting for fresh importations. Such a condition invited competition, which sought to take advantage of the great demand created by Ascher's Artificial Enamel.

Commercial success must be considered as positively separate and distinct from professional success, although the two may coincide. One dentist might be the only successful user of a material or process, while commercial success requires many purchasers for a considerable period of time.

After the first wave of enthusiasm had continued for a few years, a reaction spread gradually, due largely to the general use of vaseline during the plastic stage of Ascher's Artificial Enamel, which was later known to destroy the chemical value of the filling. By many the blame for the failures was cast upon the material itself.

Increasing experience, better methods, and more suitable instruments caused an upward tendency again, which continued for years, until a much larger quantity than before was being sold. During this period a superior quality and vastly increasing quantity of durable fillings resulted from the greater care and more intelligent efforts put forth.

How often has the mere announcement of such events, as that men were attempting to telephone, telegraph, fly through the air, or drive submarine boats under the sea, and countless other marvels of our times, been greeted with laughter, ridicule, and exclamations of "impossible"—"he is crazy to attempt it"—"he never will be able to do it," etc., but the dreams of yesterday have become commonplace, everyday affairs, and *we cease to wonder at them in a surprisingly short time.*

Consider the multitude of disappointments and failures that occurred during the early days of the automobile industry. What a long, instructive and very interesting moving picture could be made by showing an example of each kind of the many breakdowns that have occurred. Think of every kind you ever have experienced or heard of, from a slow puncture to trying to climb a telephone pole or colliding with an express train.

This vast multitude of accidents and disappointments, including many deaths and financial losses, has not caused men to return to the use of horses and carriages, neither do manufacturers or the public declare that automobiles have been failures. There is no doubting that automobiles of today have proven to be marvelous improvements over horses and carriages or wagons, and each year many improvements are announced.

In August one company advertised that its 1915 model had twenty-one improvements. Do we hear anyone make the brilliant remark, "Then you confess your 1914 machine was a failure?" Why should men make a similar judicious (?) statement about Ascher's Artificial Enamel, because once in ten years a very great improvement was made?

There has been no criticism because automobiles cost more than horses and carriages. They are judged by separate standards, although used for similar purposes.

Why was the automobile introduced and how has success been accomplished?

There was a real need for greater power, speed and endurance than horses possess, to which soon was added the satisfaction of additional comfort, luxury, pleasure, excitement and the display of wealth. The development and change as now realized has come very gradually. We are especially interested in *how* this successful result was brought about, as therein lies the object lesson to be applied to Ascher's New Enamel.

Years are required for manufacturers to develop their products, and general skill and intelligence, to keep their machines in good condition and learn how to run them, and both were necessary. Co-operation between manufacturer, his agents and the user was constantly necessary. Years of experimental work, stimulated by competition and hope of financial success was the producer's side of the problem, while instruction and understanding, together with considerable practice was necessary upon the user's part.

Beginning with the mechanic, it was a matter of observation and training to learn the habits of the new "critter," which later was taught to purchasers of the various makes of cars. Training schools were opened where beginners were coached until sufficiently proficient, so as not to endanger life or property too seriously when allowed to drive in the streets. The law required examinations before issuing permits to drive such dangerous machines.

The close analogy between the history of the automobile and that of Ascher's Artificial Enamel strikes one more forcibly the more carefully it is examined. In both cases there was first a great need that had not been adequately supplied. There had been a great demand for fillings more esthetic than gold and more durable than cement, which the profession generally failed to satisfy with porcelain inlays. After ten years' testing, Ascher's Artificial Enamel has most certainly demonstrated that it meets both of these requirements remarkably well.

All may recall a sufficient amount of early experiences with their discouragements attending the development of automobiles and experienced in every other line of great improvement, to which we may add every new field in dentistry, to have expected any other result with silicates. The great difficulty was we did not realize how *little we knew* about the subject and *how much* there was to learn.

It was partly the old story of *over-confidence and insufficient training* bringing failures, together with the fact that the field was so new that the knowledge of the facts had not been hewn out. It was necessary to *live* them before we could *learn* or *be taught* them, even though so very simple when once known.

Further than this, we were led to believe that "it was not loaded," while sometimes the difference between life and death has resulted from snapping a trigger without result, followed by another causing the death-dealing explosion.

Just so with Ascher's Artificial Enamel. Men frequently claimed that they used it in precisely the same manner always, yet failures resulted in one case and success in another. They simply had not realized the difference in some of the conditions influencing the different cases, whether it was deteriorated materials, faulty operation or some other factor, that caused the variation.

Unfortunately, the early tendency to blame the Ascher's Artificial Enamel for failures as they occurred lessened considerably our chances of reducing them, as that attitude not only proved to be erroneous, but prevented our studying the conditions intelligently. It is easier to drive an automobile satisfactorily now because practically all the conditions have been changed. Manufacturers have continuously improved their products, users have studied and been taught and shown how to handle them, while both have gained confidence from seeing and knowing of multiplied cases of entirely satisfactory results.

It will be necessary practically to duplicate this experience in silicate work, if the best results are to be obtained. Co-operation between users and manufacturer will be needed to bring this about—also between dentists.

It is very easy to find fault and condemn, but this iconoclastic attitude will not hasten, but rather will retard, greater success.

Constructive forces are needed, and to work intelligently we should know the causes of failures; we should *study* for ourselves, as well as learn of the most successful users, how to avoid things that displease us.

It should be stated before proceeding further that I soon found experiences as told by dentists differed constantly upon every point of failure that has been mentioned, from the introduction of Ascher's Artificial Enamel to the present time. Upon every point where anyone claimed frequent failures, *constantly favorable reports in large numbers were received* *during the same period of time.* During these early years dentists seemed largely unable to be helpful to one another, *but gradually causes and effects were established*, so that if one desired he could be informed how to avoid failures, also how to work to increase his success. Those most successful should have written more freely to assist those who failed, but this natural practice was not followed as usual, while on the contrary, dentists making failures carried their tales of woe to other dentists, failing to mention their successes along the same lines upon which they made their failures. Knowledge practically applied develops skill or ability.

As we have seen, failures invariably accompany all products during their pioneer days, and it is not at all surprising; rather we should expect them and be surprised whenever any radically new article is produced in which weaknesses or failures have no part. *The ten years' experience with Ascher's Artificial Enamel has proven the work to be very attractive and exceedingly simple to practice.* It is very unfortunate that peculiar conditions transformed this easy work into a most *puzzling* operation for some men. When a picture card puzzle is solved, what at first baffled becomes very plain, so that it is impossible to see the puzzle without instantly being able to solve it. Many dentists never solved the problems with Ascher's Artificial Enamel, and some fail to realize that others, either scientists or dentists, solved the problems for them. It is always difficult to do things right regularly, when we neither know how, nor are correctly informed as to the how, the why, where and when relating to the matter. Some actions, or performances, are so difficult, or require such dexterity, strength, or unusual skill, training, knowledge, or such a combination of abilities that few ever succeed even after long severe training and practice. The main difficulty about using Ascher's Artificial Enamel successfully in the early days was that *there was no certainty as to just what was required of the dentist.*

The correct information, with a few repetitions of the operation, often make what is apparently impossible become extremely easy, and that was repeatedly the experience of thousands of dentists using this material.

After more than twenty years' laboratory work and about eight years' general use and testing, Ascher's New Enamel appeared upon the market as the "Latest Combination," but this was the only improvement of a radical nature since it had been placed before the profession, although one slight change had been made a few years before. This new material has been used by the general profession with remarkable success for two years. While most things have their weak points, and this critical two-year period has passed, *not a single weak feature has been pointed out by the profession.*

The manufacturers of Ascher's New Enamel certainly displayed extreme confidence in their product, by freely offering it, in exchange for dealers' and dentists' stocks of the older material, through the former distributor. This was *really necessary* because *the two cannot be used together as one material*, and it would have caused endless confusion to have kept both kinds in the market; because dentists could no longer use their material without being able to purchase more shades and liquids.

The very important fact that Ascher's Artificial Enamel so decidedly *has proven to be insoluble in saliva*, corresponds to the fact that the automobile is a demonstrated fact, as neither had been accomplished so successfully before, although we occasionally still see horses used to draw the "horseless carriage." Perfection is not claimed in either instance, but we have every reason to rejoice that articles so nearly perfect are ready for our use.

The enthusiasm and desire for progress, together with unknown possibilities, was sufficient incentive to overcome disappointments and difficulties very largely in both cases. Once established, the fact that real progress had been made was the nucleus around which improvements of the articles and methods of using gathered. A great loss to the profession has been inflicted because the knowledge accumulated by thousands of individual dentists has not been placed before it so that each dentist could be encouraged by the success of others and made acquainted with methods followed, and thus be permitted to apply them for the benefit of his patients and himself.

The prominence and popularity of Ascher's Artificial Enamel led to its name, entirely or in part, being applied to all silicate cements. This manifestly unfair and many times unintentional misuse of the name increased distrust and doubt of the material, because, with no exception, every other silicate of the early years failed so completely as to be withdrawn from sale. These failures, added to those following the use of Ascher's Artificial Enamel, from whatever cause, could have no other effect than to lessen confidence in it, but as such a condition resulted from mistaken ideas and not from necessary facts, with time and a better knowledge of conditions the real facts became known—and restored confidence. It has been confidently asserted that "more silicate fillings are being placed in the six front teeth than of any other kind of filling material."

It is a remarkable fact that any new material should have so soon and and so largely displaced gold fillings and porcelain inlays. Materials that have accomplished such a great change merit our most intelligent study. In the early days our most gifted writers were strangely silent upon the problem and there was a tendency among many to belittle the subject, which has had a depressing effect upon the study that should be going on.

It is to be hoped that a scientific investigation of silicate cements will be started soon by the National Association, through its research department. Let the facts and truth about these materials be known. The chemical phase of the subject is entirely out of the sphere of the dentist who has not had an extremely exhaustive chemical training.

It has been the constant and repeated clinics and papers treating of all kinds of operations through many years that have developed confidence in materials and methods generally and enabled the modern dentist to become skillful in their use. The same methods exactly are needed today to develop the same conditions with Ascher's New Enamel. Directions for its use today are the result of ten years of clinical study, and consulting with the Berlin chemists. Directly or indirectly, influences that were entirely commercial in character have caused dentists to change from one silicate cement to another, while they should be considered strictly by a professional standard. We should not be subject to whims, popularity, vacillation or the emotions of a base ball fan, *but rather we should have and demand the more substantial knowledge that is founded upon true professionalism. It is time we derived the maximum good from Ascher's New Enamel,* and to accomplish this will require dentists' co-operation. There is no reason why any fair operator, who will give the subject a little study, and follow instructions as published, can not get good results from using Ascher's New Enamel, which can have no other effect than to please his patients and increase his bank account.

The silicate subject is one of the very greatest importance now, and if thus far you have not felt like trying any silicate cement, remember that some conservative people make the very extreme mistake of being so fearful of committing a blunder that they never make any attempt to change or progress. There must be a starting point or there can be no development.

Remember, that to have success with Ascher's New Enamel it must be kept in good chemical condition (although to a large extent it is self-preserving), and for users to develop a reasonable amount of skill in its proper use. This we expect of every kind of operation performed by us, but during the early pioneer days this idea was seldom associated with the work.

Since the simple method of using Ascher's Artificial Enamel has been understood and proven to be highly successful, the greatest of early difficulties has been removed. *The operator has been decidedly helped by the many great improvements found in the new material.*

Combine this increased information with the easy working quality and it makes a very attractive operative condition.

COLLEGE DEAN DEAD

Dr. James Truman, a former dean of the dental department of the University of Pennsylvania, who was identified with dental work and teaching for nearly 61 years, died November 26, at his home in Philadelphia. He was 88 years old.

THE SPECIFIC CAUSE AND THE PROMPT SPECIFIC CURE OF PYORRHEA ALVEOLARIS OR RIGGS DISEASE*

BY C. C. BASS, M. D., AND F. M. JOHNS, M. D.

TULANE COLLEGE OF MEDICINE, NEW ORLEANS

IN AUGUST OF THIS YEAR we found amebae in a stained preparation of pus from a case of pyorrhea alveolaris. Struck with the possible importance of the observation, we at once secured and examined specimens from six other cases of the disease in patients in the wards of the Charity Hospital. Apparently the same species of ameba was found in each of the seven cases. Their close resemblance to the entameba of amebic dysentery and the marked specific favorable influence of treatment with ipecac and emetine in amebic dysentery led us to expect that the same effect might be exerted on this form of amebic disease also. Up to this time we were not informed on the literature of the protozoa of the mouth and had never read or heard any suggestion that amebae were pathogenic in the mouth. We were, however, familiar with the fact that ipecac, and, more recently, the active principle of ipecac, emetine, acts specifically against amebic infection of the intestine. We began treating cases as we would amebic dysentery, with emetine, and have since made considerable search into the literature, to learn that pyorrhea alveolaris was written about more than three hundred years ago, probably the same ameba that we had observed had been described by Grassi in 1849, and many others since, and that emetine, one of the active principles of ipecac, a remedy used for (amebic) dysentery more than sixty years ago, had been applied locally in cases of Rigg's disease, with favorable results, by Barrett[1] in collaboration with Allen J. Smith, in June of this year. So far as we know, ours is the first treatment of the disease by emetine given hypodermatically.

Amebae in the mouth have been observed and described by many writers since 1849, when Grassi named one species *Ameba gingivalis*. Sternberg[2], in 1862, described *Entameba buccalis*. This name is retained by Prowazek[3] in 1904.

An ameba (*Ameba kartulis*) was described by Kartulis[4] as pathogenic, and found in suppurating tumors in the mouth in Egypt.

Smith and Barrett[1] announced their belief that "*Endamoeba*" *buccalis* is pathogenic and present in all cases of Rigg's disease, at the June 30 to July 2 (1914) meeting of the Pennsylvania State Dental Society, and stated that they had obtained favorable results by local application of emetine hydrochlorid. Their paper was published in the August number of the *Dental Cosmos*.

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* Read before the Orleans Parish Medical Society, September 14, 1914.

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The presence of *Endameba buccalis* in diseased gums was recently published also by Dr. Angelo Chiavaro[6], of Rome, Italy, in a paper read before the American Dental Society of Europe, at Paris, July 30 to August 1, 1914. He found it in every one of twenty-two cases of pyorrhea and fourteen other cases, not pyorrhea, out of a total of sixty-eight examinations. He concluded that "the endameba has no pathogenic action; on the contrary, as it feeds on bacteria, it is most probably an adjuvant in the auto-disinfection of the mouth. It is found in the pus of all cases of pyorrhea alveolaris."

We have examined material from the lesions in eighty-seven cases of pyorrhea, and have found amebae in eighty-five of them. One of the negative cases was a single slide prepared a distance from the laboratory, from the gum of a patient who was convalescing from plague. Pus could be squeezed from her gums, and the diagnosis of pyorrhea alveolaris seemed indicated. It may be possible that other preparations from other teeth would have shown amebae. The other negative case was that of a 13-year-old child with acute gingivitis, involving all the gums, of about eight days' duration. Thorough search failed to show amebae, and we now believe this probably was not a case of pyorrhea alveolaris or Rigg's disease.

In addition to the eighty-six cases in which the disease was either diagnosed by dentists or was so advanced that no mistake could be made, we have made more than a hundred examinations of preparations made from apparently normal gums and teeth, either in the mouths of patients who had the disease involving other teeth, or in people who appeared to have normal gum margins. We have not been able to find amebae in a single such instance. We have, however, found them on several occasions in instances where the gum margin appeared inflamed and diseased, but the best that we could determine the disease did not extend to the alveolar margin. Such cases, perhaps, could not be called pyorrhea alveolaris, but they are probably the beginning of the disease. In several instances we have found amebae in similarly mildly inflamed and "easy to bleed" gum margins of one or more teeth in patients who had well-advanced Rigg's disease around other teeth. We have found amebae around teeth in what we have considered to be all the different stages of the disease in the same case, from the slight redness at the gum margin and tendency to bleed easily to the tooth hanging loose in its socket or standing, entirely stripped of gum, on the exposed carious bone.

The technic of examining for the amebae is very simple. Remember that they are most numerous in the bottom of the lesion. A little material is removed with a suitable instrument (a good toothpick serves the purpose well), diluted on a slide with a little salt solution, saliva (patient's) or water. A cover glass is placed on the diluted material, which should be examined promptly with the high dry lens of the ordinary microscope. By careful search amebae are found, showing the characteristic ameboid motion. We are not prepared at this time to say whether there is more than one species to be found. The amebae we have seen vary in size from about that of a leucocyte to about three or four times this size. No contractile vacuole is recognized, but nutritive particles, more refractile and more prominent in appearance, are observed. The ectosarc is quite clear and is well differentiated from the endosarc.

These amebae are easily demonstrated in stained specimens. A good method is to make a thin spread of the scrapings and pus from the bottom of the lesion on a slide, allow to air dry, fix with heat and stain with carbol-fuchsin about one-fourth minute, wash, stain with Loeffler's methylene blue about one-half minute, wash, dry, and examine. The amebae are well stained by this method, and show their inclusions of tissue or cell remains, indicating pathogenicity. We have been unable to demonstrate that these amebae take up bacteria, though they sometimes appear to do so.

Ipecac has been employed with success in the treatment of amebic dysentery for many years, but on account of its nauseating effect and sometimes impossibility for patients to retain it in sufficiently large doses, there has been more or less dissatisfaction in its use. Vedder[6] found that fluid extract of ipecac was destructive to cultural amebae in solutions of 1 to 200,000. Rogers[7] experimented with the active principle of ipecac, emetine, and found that it would kill entamebae in stools in solutions of 1 to 100,000, and began using it hypodermatically in 1912 in the treatment of amebic dysentery. It is now very generally employed in this manner for this purpose, and with fairly uniform results. The action of emetine in amebic dysentery is very prompt, striking and specific. Usually the entameba cannot be found in the discharges after twenty-four to forty-eight hours of treatment, and the bloody mucous stools give place to normal formed stools in three or four days. There is considerable tendency to relapse after the treatment has been discontinued for a time, but no doubt a considerable number of "relapses" are, in fact, reinfections.

We have not tried the injection of solutions of emetine into the gum and pus pockets, as Barrett and Smith[1] did, because it has not seemed to us reasonably probable that all the diseased tissues could be reached in this way. Whenever a patient has advanced Rigg's disease in one or more teeth the disease also exists around and between many of the other teeth. The interdental tissue is often soft, spongy and bleeds readily. Often simply sucking the teeth causes bleeding. Careful examination reveals active motile amebae present.

The results of our experiments, so far, are most gratifying. We have had sixty-eight cases under observation and treatment from two days to two weeks. The doses of emetine experimented with have been from one-half to one grain. Only one dose was given in a day. Several cases have been given a dose daily for several days. Others were given one or more doses until the amebae disappeared, after which an interval was allowed to determine how long it would be before they would return, or what other results could be observed. In several instances no amebae could be found the next day after the first dose was given. In a few, however, they were found the next day after emetine had been given on two successive days.

In no case have we been able to find amebae the next day after emetine had been given on three successive days.

As to the duration of the absence of demonstrable amebae following the three (or less) doses of emetine, our studies have not been conducted long enough to determine. In one instance we found amebae on the fourth day after the last emetine had been given. In another instance we found them on the sixth day. In several instances none could be found after seven days or longer intermission of treatment. On account of the wide distribution of this ameba in nature and the character of the lesions of the disease, we do not think it very likely that bad cases of pyorrhea alveolaris will be permanently disinfected by a few doses of emetine given during a few days. The chances of reinfection are so great and the damaged gum, alveolar and tooth structure offer such favorable soil that it must surely be necessary to continue the specific treatment until Nature has had time to fully heal the disease. The length of time necessary for this will no doubt depend upon many factors. Healing and repair of diseased bone is always slow. Whenever the disease involves only the gum, and has not reached the bone (alveolar structure), it is our impression, from observations so far made, that probably the length of time necessary for the gum to heal will not exceed a week. We have observed great change in forty-eight hours, and gums that bleed easily often become perfectly normal in this regard in from twenty-four to seventy-two hours. The results are so striking that there is no doubt in the mind of the doctor or the patient.

Our experiments have not advanced sufficiently to enable us to lay down dogmatic rules as to the treatment, but we are certain that rapid and favorable results may be expected to follow the administration of one-half grain of emetine hydrochlorid hypodermatically (in any part of the body) daily for three or four days. In all except the early, mild cases it may be necessary to repeat the treatment, during one or more days, after an interval of three to ten days. In the worst cases no doubt it will be found necessary to repeat the treatment several times before the disease is entirely well. No doubt removal of tartar, scales and other local dental treatment should also be done at the same time. It is quite likely that the injection of a weak solution of emetine, one-half per cent., as used by Barrett,[1] into such lesions as can be reached by it will be found to favor success from the hypodermic treatment with emetine.

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CORRESPONDENCE

"I'M FROM MISSOURI—YOU'LL HAVE TO SHOW ME"

In October issue of The Summary I note a warm little article entitled, "Pyorrhea and Graft," and our friend from Missouri gives some cross cuts of how to get through in a hurry, thereby, as far as possible, eliminating all the graft possible.

I should like to show Missouri that while in some instances he is making a short cut and maybe saving a little time, yet I believe the doctor is, unawares, walking backwards part of the way.

We are advised that the most important part in the treatment of gum troubles is to clean house; get rid of all the filth and pus possible, but that we should not employ all the force possible by using the modern compressed air behind the spray.

I should like to show Missouri that he is condemning the one *quick* means of cleaning house, one that will reach deep in the pus-laden recesses and is an enemy to all gum troubles—the force of the compressed air and the spray.

We are also advised to "let the patient clean house," in which event we will say that they don't know how and all they could do in a case of pyorrhea is to moderately brush the teeth, and in all events fail to help the trouble which is under the gum tissue, so I say it takes the hose with pressure to force the cleaning agents down deep in order to clean up.

If one must graft, I can think of no easier way than to spend hours cleaning up a filthy mouth and treating the deep-seated diseased conditions with a limited equipment, just like one could hope for the success of a modern farmer doing business with the hoe and the one-horse plow and at the same time saying, "You fellers with that machinery look a little like graft somehow."

Can one think of a better and quicker way of sweeping out the mouth, getting between the teeth and deep in the pus pockets than by compressed air behind the spray? And would any modern dentist think of using pumice in cleaning the teeth, without afterward blowing and sweeping all particles of same out from under the gums?

Many times I have had patients remark: "I never had any trouble with my gums until I had them cleaned by a dentist," and why?

Pumice is used by most dentists in the process of cleaning teeth. This material, if given a chance, will bury itself in the tissues and cause irritation and gingivitis. Had the dentist been equipped with an effective compressed air and spray, using same diligently for a minute or two, the chances are that patient would not have made the remark that his gum trouble started after the visit to his dentist, who was worse than a grafter—a spreader of disease.

Therefore, shall we several thousand dentists who are cleaning house every day by improved methods, discard our best weapon? I trust our brother from Missouri will think seriously for a while and decide that we have shown him that in addition to his prescription he needs to add this one and use it for two minutes on every patient just before operation, in the first place to accommodate his nose, and in the second place to make the patient appreciate a better taste in the mouth and in the course of the operation instruct the patient how to keep same feeling in that improved condition. As it would take only one or two minutes to do this little preliminary, it could be done without charge and the patient would appreciate it.

Let us figure that the compressed air in the operating room holds the same position that the vacuum cleaner does in the home, and let's look over this prescription I am going to offer to all the honest or grafters, if you please, who are not equipped with what I term a necessary adjunct to a well equipped office.

One self-acting automatic compressed air outfit.

One good spray outfit.

Keep same in good working order.

Keep the antiseptic and deodorant warm.

Before beginning in every operation clean house by use of spray, using two minutes time.

Before beginning the treatment of gum troubles spend two minutes in cleaning the mouth and pus pockets, using thirty pounds' pressure.

Use the same siege guns before and after "cleaning teeth."

Turn the same hose on yourself every day with an odor killer as a filler for the spray bottle, more especially if you chew, drink or wear false teeth, because the patient may get a whiff by mistake.

E. G. STAMPER

Paducah, Ky.

Indiana—1915

The next annual meeting of the Indiana State Dental Association will be held on the 18th, 19th and 20th of May, 1915. A distinctive feature of this meeting will be that the program will be made up exclusively of Indiana dentists. A cordial invitation is extended to members of other dental societies to attend the meeting.

A. R. ROSS,
Secretary, Lafayette, Ind.

EDITORIAL

A Friendly Criticism

RULES adopted and hereafter to be practiced by the fifteen ethical dentists of..............................., members of the .... Dental Society.

1. Monthly statements sent to each patient.

2. Prompt payment expected unless otherwise arranged.

A card as indicated above has drifted in to us, and while we think it subject to friendly criticism, it is certainly a move in the right direction.

Time and again it has been proven that no successful business can be conducted without the handling of accounts in a systematic, business-like way. This necessitates the sending of a statement promptly on the first of the month, the sending of another the following month if the account is not paid, said statement accompanied by some polite phrase calling particular attention to it, and a systematic following of the matter until the bill is paid.

The card shown above is intended for enclosing with monthly statements. It is weak in that it specifies a rule adopted by fifteen dentists, and might prove offensive to some because it approaches the methods of combinations and trusts. It would be better to follow the rule without telling patients of the combination with fellow practitioners.

A slip attached to a statement containing Rule 1 and Rule 2, without the last three words would be more business-like, and, we contend, just as effective, or more so.

A substitute for Rule 2 might be, "Credit is extended under the assumption that accounts will be paid promptly."

After all, rules and regulations are of no benefit unless they are put in force.

Annex

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